Architectural
CONCRETE

Jackson Tiger Gets New Lair

By A. Hays Town

THE Tiger, symbol of academic and athletic achievements among the junior high school grades at Jackson, Mississippi, has a brand new lair to guard. For, with the end of summer vacation this year, hundreds of Jackson youngsters resumed classes, athletic and vocational activities in a new building whose long, Z-shaped plan includes as complete a modern school plant as can be found anywhere in a structure of comparable size.

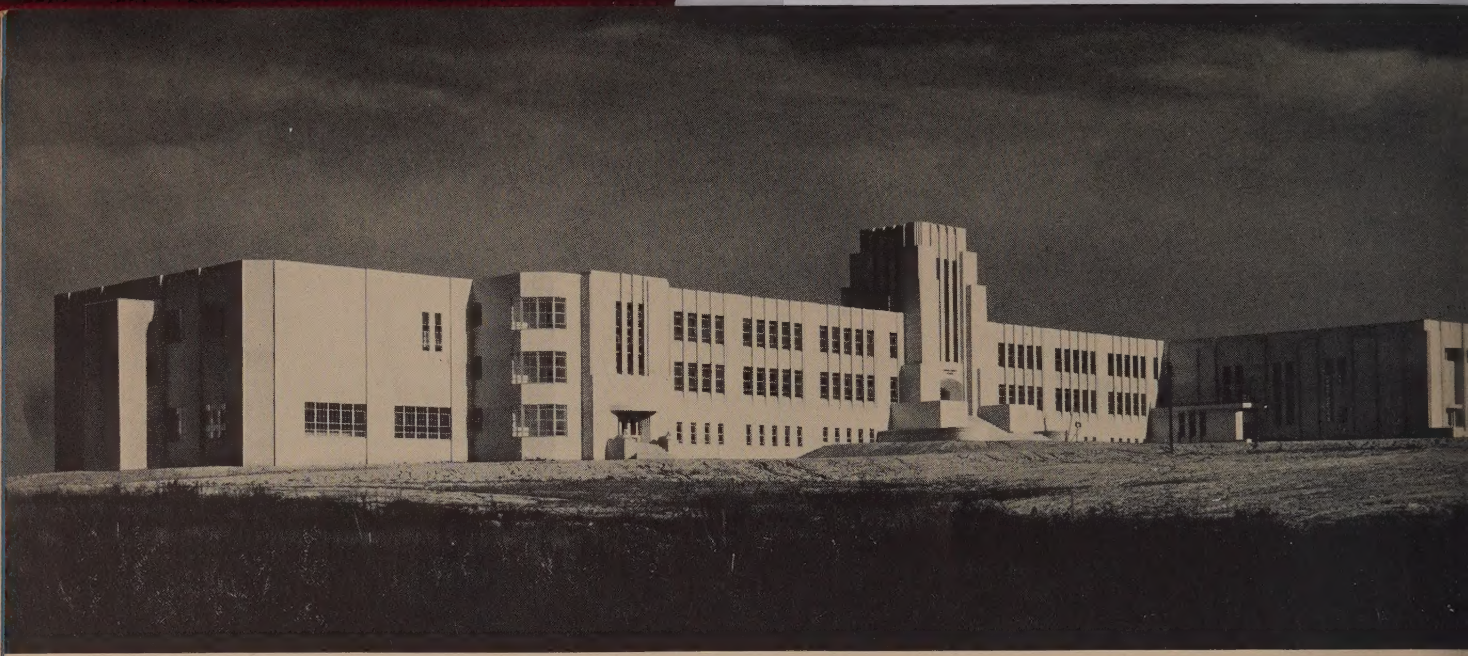
The Tiger, school symbol, in cast stone, guards the gymnasium door.

Edward L. Bailey School, as it is known, was completed in July at a total cost of $350,000 including equipment or 18.2 cents a cubic foot. It represents a year and a half of careful planning and construction work to provide additional educational facilities for this rapidly growing city. It increases class room space by 21 ample rooms; it provides special quarters for the study of fine arts, natural sciences, vocational arts and home science; it is equipped for the participation of every student in physical education work, and its large auditorium becomes a civic center as well as a school assembly hall. A library, cafeteria and club rooms for students and parent-teacher groups complete the layout designed for a well-balanced, modern educational program.

Architecturally, the building's general plan and shape express its function, while its detail is a logical concession to public taste. The architects well know that the current tendency in architecture is toward a more functional, possibly more severe design than that adopted; but we did not feel that a building of that style would be as fully appreciated as a more conservative structure of monumental character. Consequently, the style selected may be designated as "conservative-modern," and we believe that it is particularly adapted to architectural concrete construction.

The decision to use architectural concrete for this new school was based on years of happy experience with reinforced concrete. We have used concrete frames in our buildings for a long time, including the Standard Life Building of Jackson which is 12 stories high. In some of our recent jail work we have exposed the concrete and have been more than pleased with the results, although no particular efforts were made to treat the surfaces. Observation of a large number of concrete bridges built by the State Highway Department which have beautiful rubbed surfaces, reinforced our conviction that rubbed concrete walls would produce a beautiful school building. Ample supplies of splendid sand and gravel are available in all parts of the state for aggregates.

Having decided that a concrete frame and floors were a minimum requirement for the sound structure we envisioned for Bailey School, we considered the use of a conventional masonry exterior of brick. But with many window openings and wide spans, the spandrel beam would take up most of the distance between the window heads and sills. And since columns are spaced at frequent intervals, a masonry exterior would have amounted to nothing more than a veneer job with an 8-in. monolithic back-up. Elimination of masonry and treating the concrete by rubbing was therefore con-



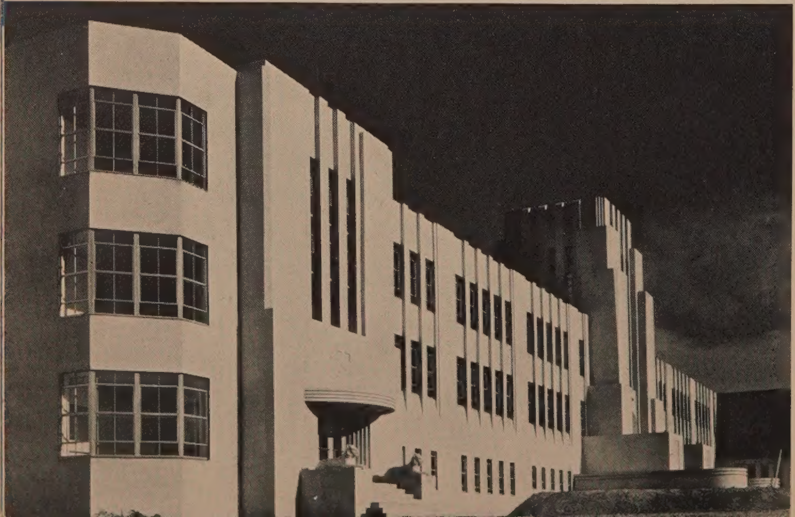
Twenty-one class rooms and special study rooms occupy the central portion of the building. The auditorium projects forward at right with entrances close to the sidewalk. At left the gymnasium projects back from the front facade.

sidered the most practical, economical procedure.

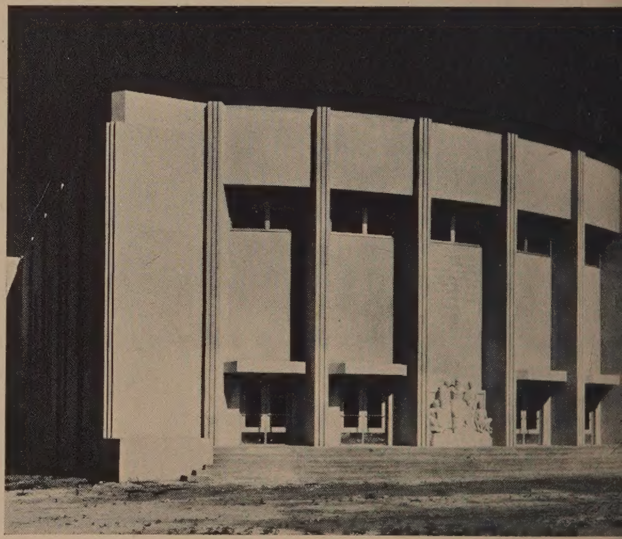
Principal motif of the building is a tower which dominates the central portion. Of monumental proportions, it is flanked by concrete buttresses with ornamental panels cast in place. The design of this tower and the location of the main entrance at first-floor level rather than at ground-floor level were made to emphasize the entrance to the administrative offices which will be used by the public rather than school children. There will be little doubt as to the proper place for parents and the public to enter the building to conduct business with school officials.

Bas-relief work on the buttresses of the entrance represent the Treaty of Doaks Stand, at which treaty conclave Andrew Jackson and Hinds traded the Indians, represented by Chief Pushmatah, out of what is now Hinds County, offering them in return some "greener pastures" across the river.

The right wing of the school comprises the auditorium, a hall and balcony with seats for 1,100. This wing was made prominent because it is more than a recreational facility. It is a place for the training of children, a laboratory for dramatics and forensic exercises. Because it will be thrown open for public use at frequent intervals, the auditorium entrance is located near a corner intersection where it is easily available from the street. The entrance facade of the auditorium is rounded, with six slender pylons dividing the space into five equal parts—two doors on either side of a central niche which contains a concrete sculptured group symbolizing Character, Art, Music, Dramatics and Literature. Simply formed pilasters break up the side walls of the auditorium into vertical panels, some of which contain tall windows.



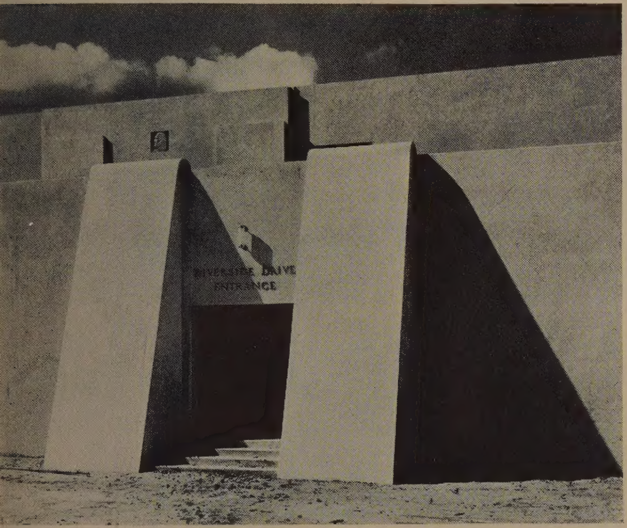
The main entrance, at the tower, opens into the school administrative offices.



A curved facade of the auditorium is divided into five sections by tall, slender pylons.

The left wing, which projects back from the main facade of the building, is the gymnasium, completely equipped for physical education classes. There is space for two practice courts for basketball or one large exhibition court for interscholastic games. The main entrance to the gymnasium is flanked by two imposing concrete tigers. Above the entrance is a bas-relief signifying Education. Another bas-relief on the north wall of the gymnasium represents Health.

Other entrances are given individual treatment. A side entrance for students on Riverside Drive has two massive, sloping buttresses on either side of the doors, terminating in a curve over the parapet. At the rear is a large cantilevered canopy over the automobile drive. Above this entrance is a bas-relief plaque of a modern automobile with the inscription "auto porch."

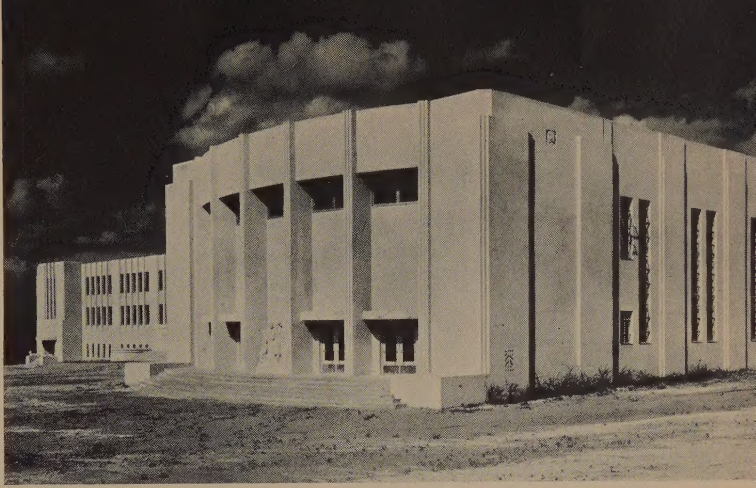


Massive, curving buttresses mark the students' entrance to the building from the drive.

All bas-relief work on the exterior including inscriptions and plaques, was executed by means of plaster waste molds inserted in the wall forms. The sculptured tigers and the group at the auditorium entrance are of cast stone, erected after the wall forms were stripped and the surfaces rubbed.

In constructing the building the chief engineering problem was to secure adequate foundations. The soil in this region is such that buildings have been known to rise, settle and even move laterally during weather changes. We feel, however, that this unstable marl soil condition has been safely overcome by extending spot footings deep enough so that a uniform moisture content prevails at all times. This eliminates expansion and shrinkage due to alternate wetting and drying. Two expansion joints in the length of the building compensate for temperature changes above ground level.

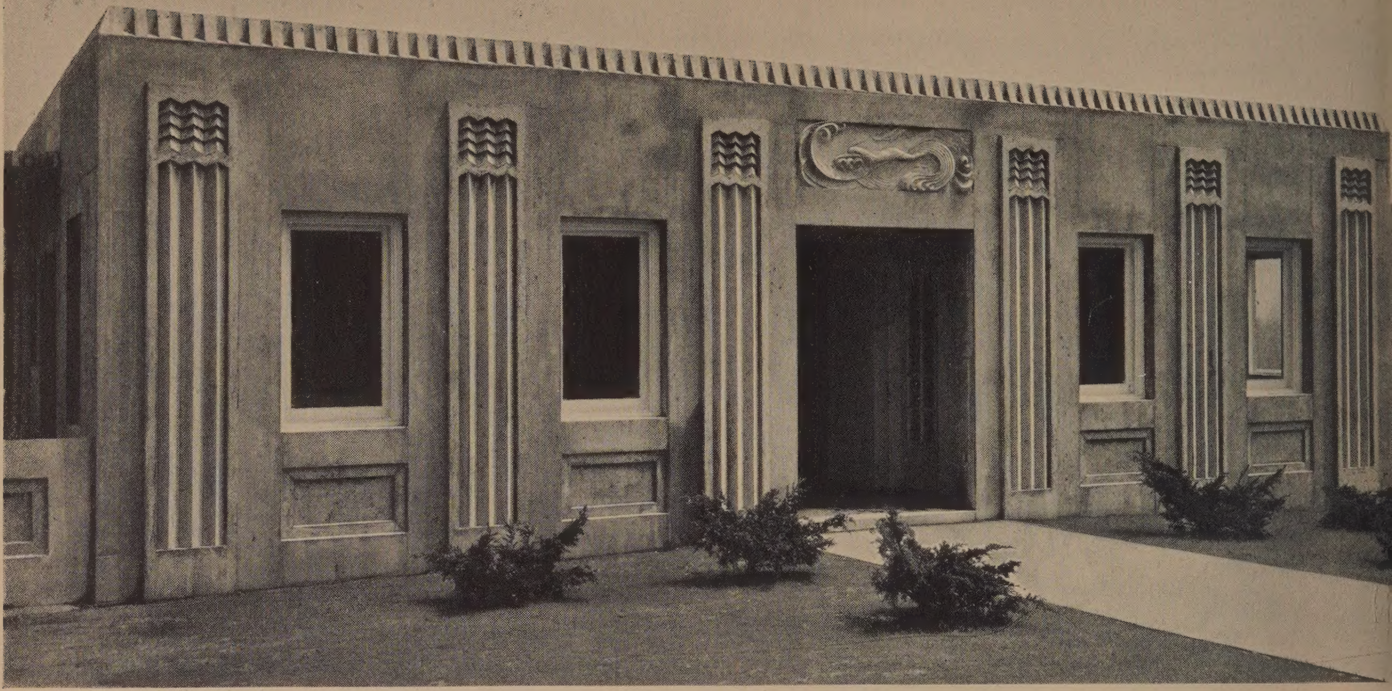
Various types of interior finish are employed, in keeping with the function of each area. The toilets have marble partitions, terrazzo floors and white cement plaster walls. The entire ground floor is a concrete slab with either terrazzo or smooth concrete finish. The auditorium is treated simply. There are grilles and large fluted plaster pilasters and columns on either side of the stage framing the proscenium. The plaster grilles are finished in aluminum leaf and reflect groups of colored lights.



Grilles, plaques and shallow pilasters, all formed with the walls, adorn the side of the auditorium.

The building, constructed by W. J. McGee and Son, Contractors, is now completed and highly satisfactory to both the architects and the school officials. Its design and construction, from beginning to the end, have provided splendid opportunities to study educational planning and also the use of concrete as a first-class architectural medium. Some important conclusions have been made in the minds of the architects.

The idea that future uses of concrete will tend entirely away from familiar architectural forms was weighed carefully—but we found reason to disagree with that theory in part. While it is obvious to us that projecting cornices, ornamental capitols, elaborate friezes, pediments and other distinguishing features of the old, established styles do not particularly express a monolithic material, no definite, absolute form for concrete has yet been determined. The great historic architectural styles did not arise from predetermined notions, but were gradually developed through efforts to adapt existing materials to sound structural forms. Increasing skill and improving tastes brought esthetic refinements. There will be a similar course for concrete. The need for a more functional, more economical type of construction will necessitate wider use of this material, and out of all this new work concrete will emerge with its own, reasonable, logical, characteristic form. These thoughts and conclusions are but the personal opinions of the architects; but they entered into the planning of Bailey School and largely account for the architectural treatment of the concrete used in this building's construction.



First structure completed in the Clayton, Mo., park development program is the bath house, a modern architectural concrete building at the side of the swimming pool. Hal. Lynch is the architect for the park work. Construction was by WPA forces.

Clayton Park Development

BY Hal. Lynch ARCHITECT

IN February of 1934, Charles A. Shaw, Mayor of Clayton, Missouri, visualized a recreational park for his city. The most likely site for the park, it was agreed, was a 30-acre rolling tract at the western edge of the town. This property was acquired in 1935, and with a bond issue supplemented by WPA funds, money was in sight for an immediate construction program. First projects in the development included an official Olympic pool, 20x50 meters, a bath house with modern equipment, and a club house for those citizens who wish to play tennis, baseball and other outdoor games. Work started on the pool and bath house in January, 1936.

Since both the bath and club houses were to be comparatively small structures, it was necessary in the design to give them an appearance of size an dignity. The architectural style i modern. Many consideration pointed to concrete as the logica construction material. Skilled me chanics were not available throug WPA and the ratio of labor to mate rial cost required by WPA had to b fulfilled. Furthermore, as a system of construction, archi tectural concrete embodies a sound and economical struc tural material which produces an attractive finish for bot exterior and interior walls.

The bath house is situated on the side of a small hill wit the pool at the lower level. The street elevation, which i the main entrance, presents a one-story facade while th pool facade is two stories. Economical use of space pr vided for a park administration office in the top floor the bath house with showers and dressing rooms on the lower level. A roof deck which surrounds three sides of the offices provides adequate space for spectators.

Decorative detail was designed for economical execution with the forming of the exterior walls. Simple panels under the windows on the front facade are continued around the structure to form a railing for the roof deck. A dentil band terminates the parapet wall and is repeated on the edges of a cantilever canopy overhanging a portion of the roof deck. Six pilasters, which give an effect of mass and height to the lower front wall of the building, were designed for simple formwork. One piece of waste mold work, a mermaid which symbolizes the bath house, is located over the entrance.

An unusual texture for the concrete was obtained by turning the screen side of the Masonite form liner to the face of the concrete rather than the smooth side. With only the panels and pilasters smooth formed, a delightful contrast in wall tones was achieved.

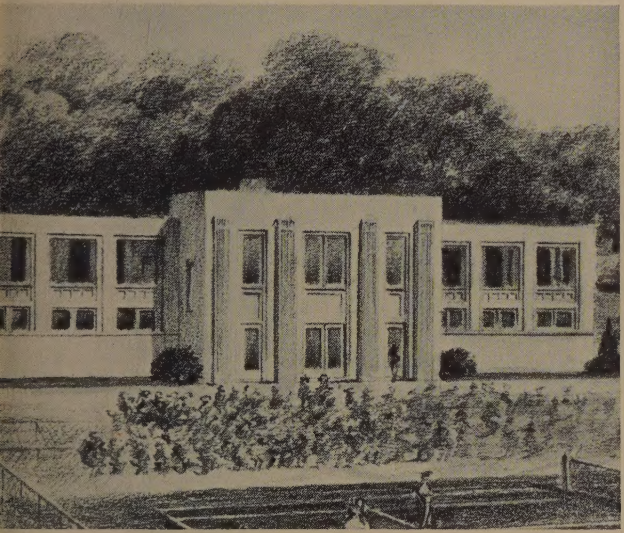
Forming plans were carefully prepared to facilitate erection. All pilaster and panel forms were made on the bench and erected as units. Pilaster forms were erected first, then the walls between them were sheathed and lined. The panels under the windows were placed after the window bucks were in place. Dentil-course forms were also made on the bench in 4-ft. sections, but they were not put in place until the concrete was within a foot of their location. This made the placing of concrete easier and assured unblemished surfaces on the dentils.

Concrete was placed a full story height in one day's work, thus eliminating cold joints in the facades. Wall ties of the "pull-out" variety were used, although insofar as possible the forms were designed to make the spacing of ties coincide with openings.

An interesting feature of the work which tends to show the possibilities of concrete in the execution of sharp detail is found in the corner-stone of the building. The architect's signature, 6 in. high, was traced on the form liner and tooled in by a carpenter. The signature, molded as a projection in the concrete surface of the corner-stone, stands out sharply against the wall without loss of the smallest detail.

After forms were stripped, the concrete was cleaned down and left without further exterior treatment. Interior walls were exposed and given a coat of cement paint. Concrete for the ceiling slabs was placed on 1-in. Celotex which was used to line the forms. Anchors from the Celotex protrude into the concrete.

Now completed, the bath house fulfills all expectations. It amply shelters the hundreds of citizens who avail themselves daily of the cool expanse of the large concrete swimming pool. In its first summer of use, these recreation facilities have more than justified the vision and work of Mayor Shaw, founder of Clayton's new park.



Architect Lynch's project for park club house, another building designed for architectural concrete.

A balcony, running around three sides of the bath house, provides room for spectators to watch water carnival and racing events in the large, modern concrete pool.

Longest Rigid Frame Bridge

Hollow Structure Spans 175-Foot Gap

By Homer M. Hadley*

LONGEST single-span rigid frame concrete bridge in America, and possibly in the world, was recently completed and opened for use in Schmitz Park, Seattle, Washington. With a span of 175 ft. from hinge to hinge, 54-ft. roadway and two 6-ft. sidewalks, it is 60 per cent longer than any similar highway structure of its type in the country, largely made possible by the reduction in dead load through the use of cellular construction both in deck and vertical legs. The only rigid frame bridge approaching its length is a park maintenance bridge at Kenosha, Wisconsin, which is 146 ft. long but only 10 ft. between curb lines.

Schmitz Park Bridge carries Admiral Way, one of the principal streets in the West Seattle district, over a wooded ravine which forms the main entrance to the park. On the west bank of the stream at the bottom of the ravine is a park roadway, and a similar road for the east bank is planned for the future. It was necessary to span these naturally divided roadways and the stream between them with the new bridge.

Aside from the safety value of its broad roadway and improved alignment, Schmitz Park Bridge is a structure of beauty and dignity, designed to harmonize with its woodland setting and the residential area which lies adjacent to the park. The adopted design was selected from a number of preliminary studies and layouts.

There are four main hollow frames carrying the deck. They are 8 ft. in breadth, 5½ ft. deep at midspan and 18½ ft. deep at the haunch where a circular hip section connects them to the legs, the section of which tapers

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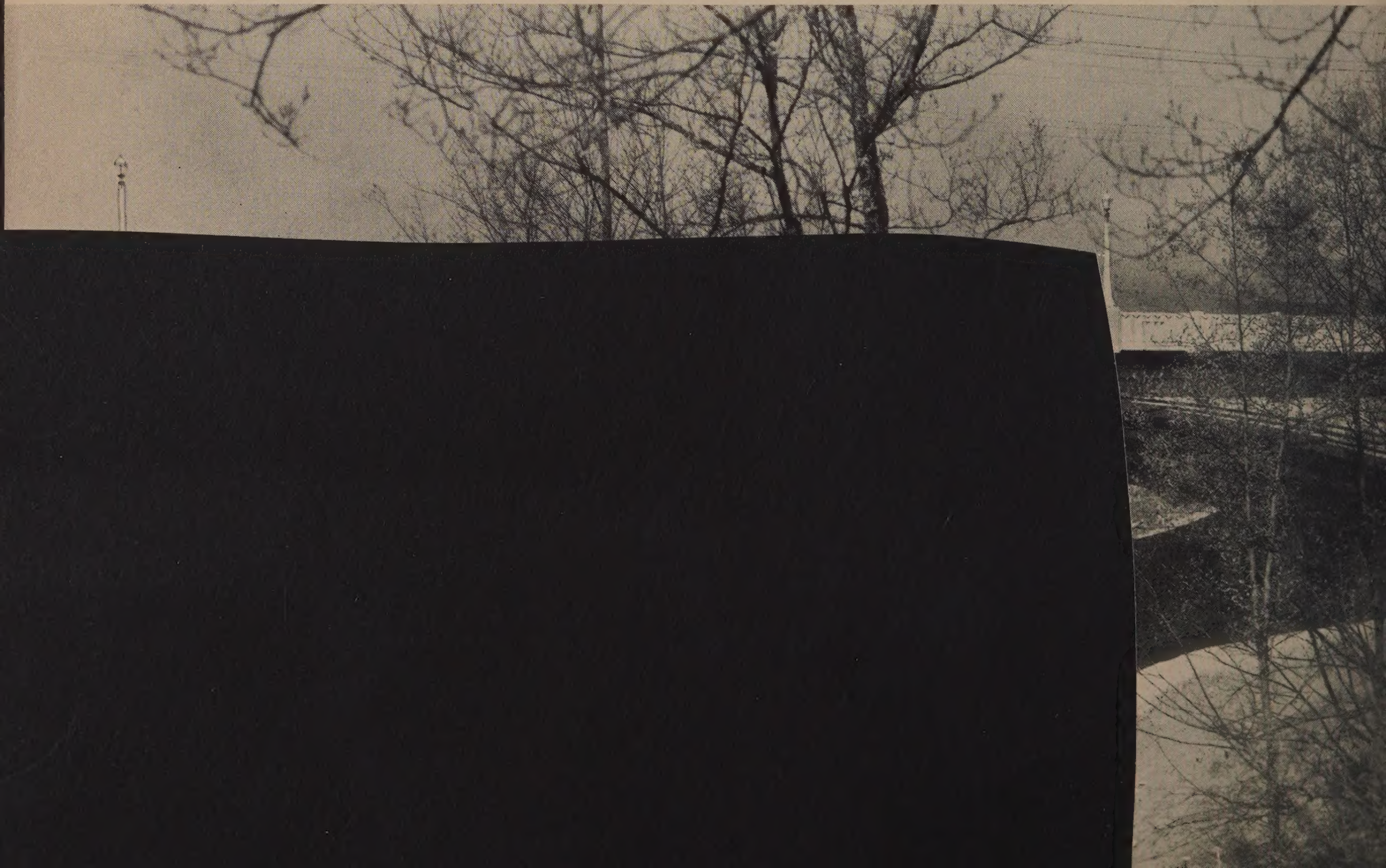
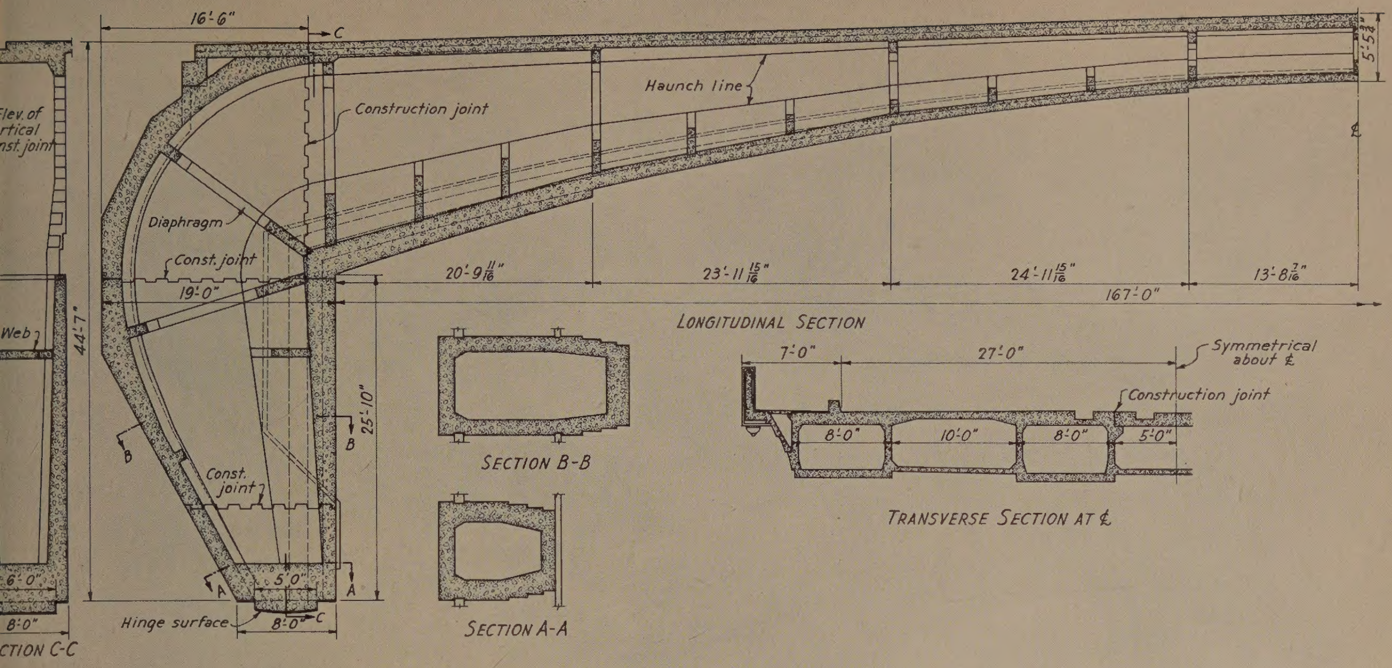
*Regional Structural Engineer, Portland Cement Association, Seattle.

Longest rigid frame concrete bridge in the United States, a 175-ft. span, crosses the main entrance to Schmitz Park, Seattle, Wash. Principal construction feature is its hollow frame, designed by bridge division of the Seattle Engineering Department.





downward to the footings.

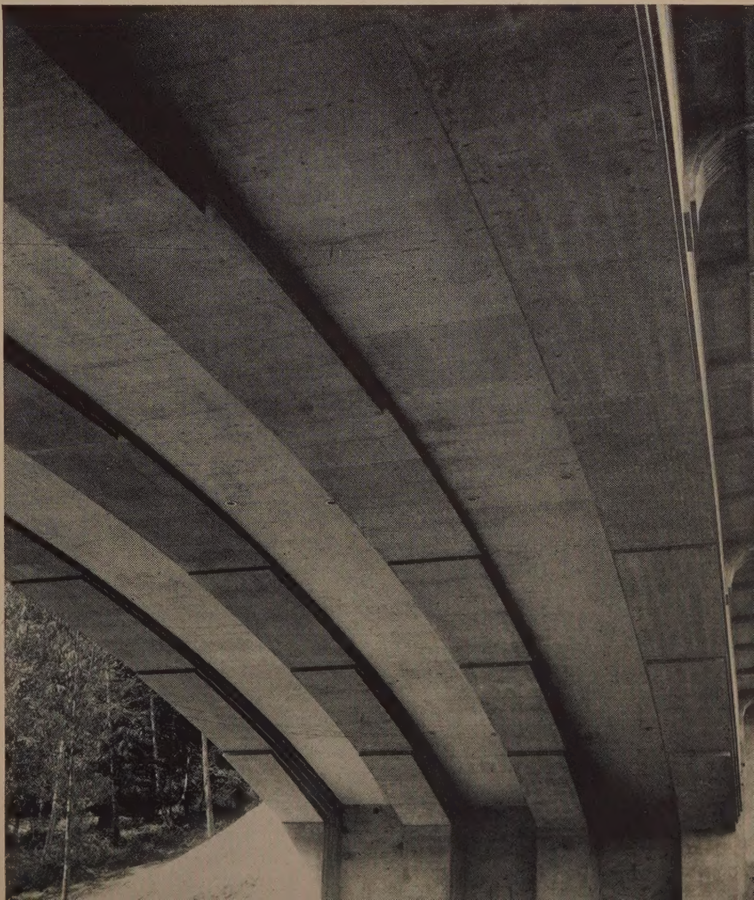
These four hollow frames are internally braced by transverse stiffening frames and by heavy fillets at the top and bottom of the side walls. They are also braced across the 10-ft. clear spaces which separate them, by other stiffening frames and by the light slabs, 2¾ in. thick, which close these spaces and provide the desired appearance of the soffit. Between the legs the continuation of these slabs takes the form of walls 4 in. thick which are deeply offset, carry no load and are for architectural effect only.

The top slab of the girders, which in part forms the deck, is 9½ in. thick increasing to 15½ in. at the haunches due to the massing of reinforcement at these points. Webs of the girders are 6 in. thick at midspan and 8 in. at the haunch.

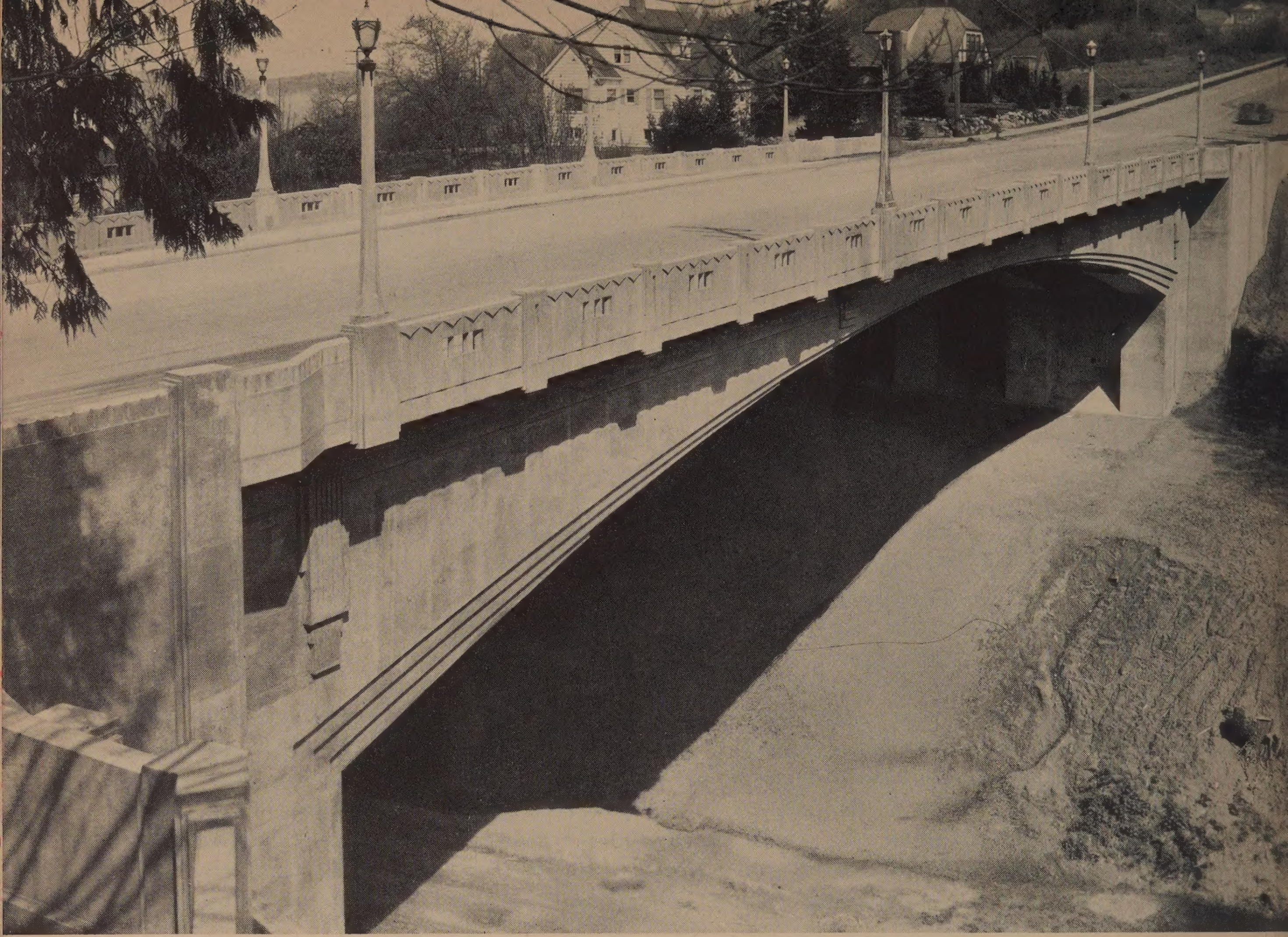
The apparently massive abutments consist of leg sections of the frames and of separate cellular walls which retain heavy earth fills. Heavy slabs at the rear side of the legs close the spaces between them and aid in retaining the embankment.

The legs of the frames, solid at the bottom, terminate in rocker bearings 5x6 ft. in dimension, which are segments of cylindrical surfaces. These bearings fit into similarly shaped sockets in the top of the footings, forming the hinge. The sockets are lined with ⅛-in. asbestos packing.

Architecturally, as well as structurally, the bridge is most successful. There is mass and size required by the length of the span, and the large scale gives impressive dignity. Decorative detail is limited to narrow offsets at the intrados of the arch and shallow fluting in the handrails. Although the handrails are solid, except for the small open panel piercings midway between posts, they appear light and graceful. In contrast to the delicate, swaying branches



Soffit view shows interesting manner in which the four 8 ft. wide frames were treated to obtain pleasing architectural effect.

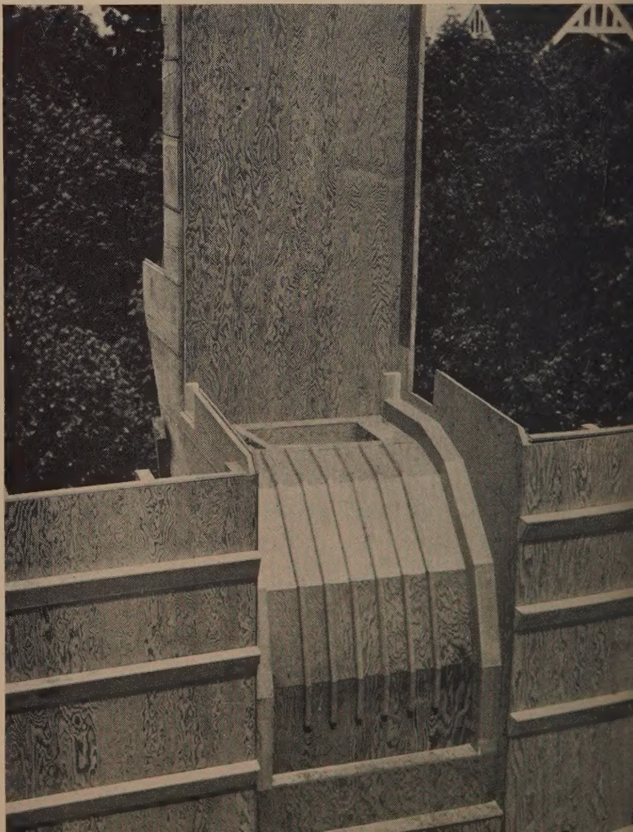


The long, graceful arch of Schmitz Park Bridge is simply and tastefully decorated with formed detail. The solid handrail is lightened in appearance by small piercings between the posts.

of the nearby trees, the great, grey bridge is a steady motionless vault sweeping from bank to bank.

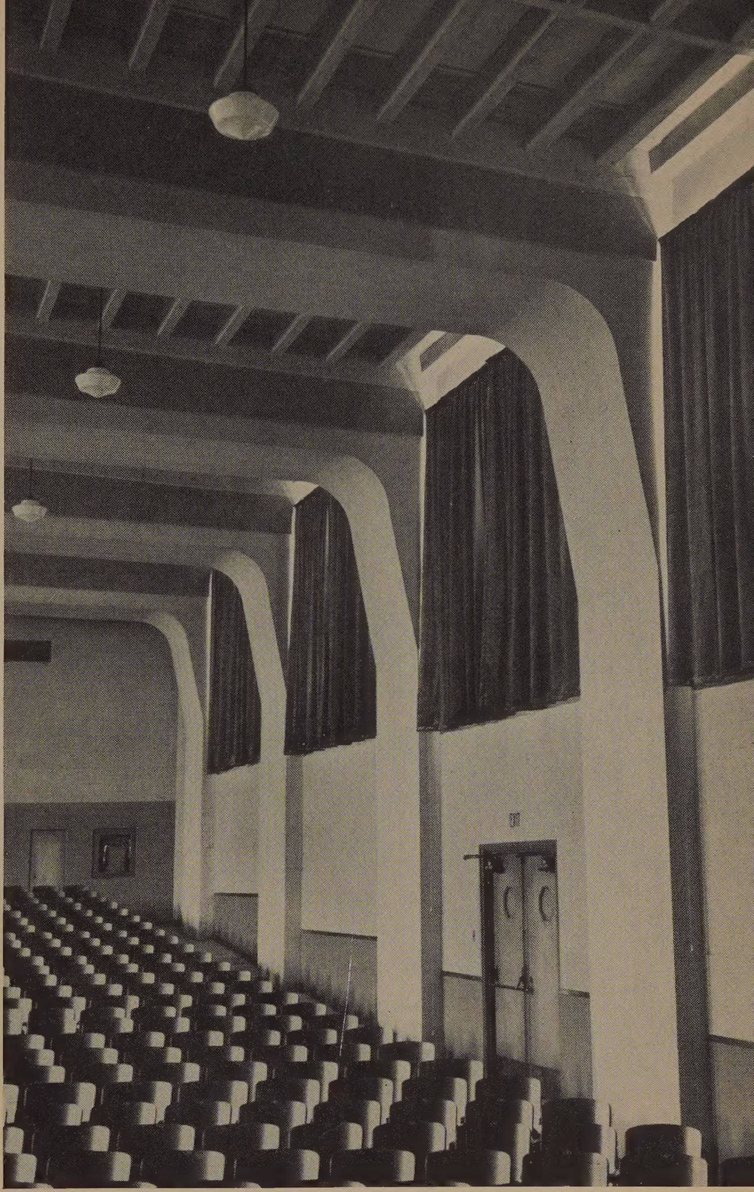
Plywood forms were used throughout, producing smooth plane surfaces. Exceptionally fine concrete, mixed at a central plant and hauled three miles to the job, was used. Cylinder tests at 28 days showed an average of 4166 p.s.i. Although some sections were thin and heavily reinforced and involved unusual difficulties in placement, a plastic workable mixture, thoroughly spaded and vibrated, filled the forms uniformly and completely.

The Schmitz Park Bridge was designed by the bridge division of the Seattle Engineering Department when Clark H. Eldridge, now bridge engineer of the Washington State Highway Department, was its head. Construction was under the supervision of his successor, J. A. Dunford. N. C. Carle is City Engineer. Schuehle Brothers, of Seattle, were the contractors.



Plywood forms with wood mold inserts produce interesting detail on the corbels under each post of the handrail.

The deep beams and graceful columns which dominate the interior architecture of Bradford Avenue School Auditorium, Placentia, Calif., are a series of five hollow rigid frame bents which form the structural frame of this unique building. T. C. Kistner, architect; William T. Wright, structural engineer; C. L. Wurster, general contractor.



Five Rigid Frames —One Roof

First Use of Hollow Girders in Building Construction

By William T. Wright*

STANDING alongside the new Bradford Avenue School in Placentia, California, is a still newer auditorium, just completed for use in the autumn of 1937. It is a rather low-lying structure of contemporary architecture with strong, balanced masses. Its monolithic walls are vigorously marked in horizontal patterns, and its texture is slightly rough to give vigor to the design, indicating that the building is meant to shelter and protect against all damage and to endure for ages. But, whatever are its merits as an architectural complement to the Bradford School class room units or as a spacious, comfortable theater and auditorium, they must be set aside here for a discussion of a phase of its structure that makes it an unique building. That interesting feature is a hollow girder roof, the first of that type of construction, in the knowledge of the writer, that has ever been applied to buildings.

In plan the auditorium is 77x127 ft. The 77-ft. clear span is accomplished by means of five hollow girders which, with their hollow column supports, form a series of five rigid frame bents 26 ft. high and spaced 18 ft. apart. The girders, which vary from 5 ft. in depth at midspan to 4 ft. at the ends, to aid drainage, are 4 ft. 7 in. wide. This same width is carried down the columns which rest on continuous footings running the length of the building.

While the girder-column bents form the structural frame of the building, they also dominate both the interior and exterior architectural design of the auditorium. The girders make deep ceiling beams which connect gracefully, by means of curved fillets, to the wall pilasters. On the exterior the columns project as buttresses, giving the building an added appearance of sturdiness.

The top of the girder is flush with the roof slab which has a clear span of 13 ft. 2 in. between girders. Approximately one-quarter of the roof area is carried directly by the girders. Intermediate concrete joists transmit the re-

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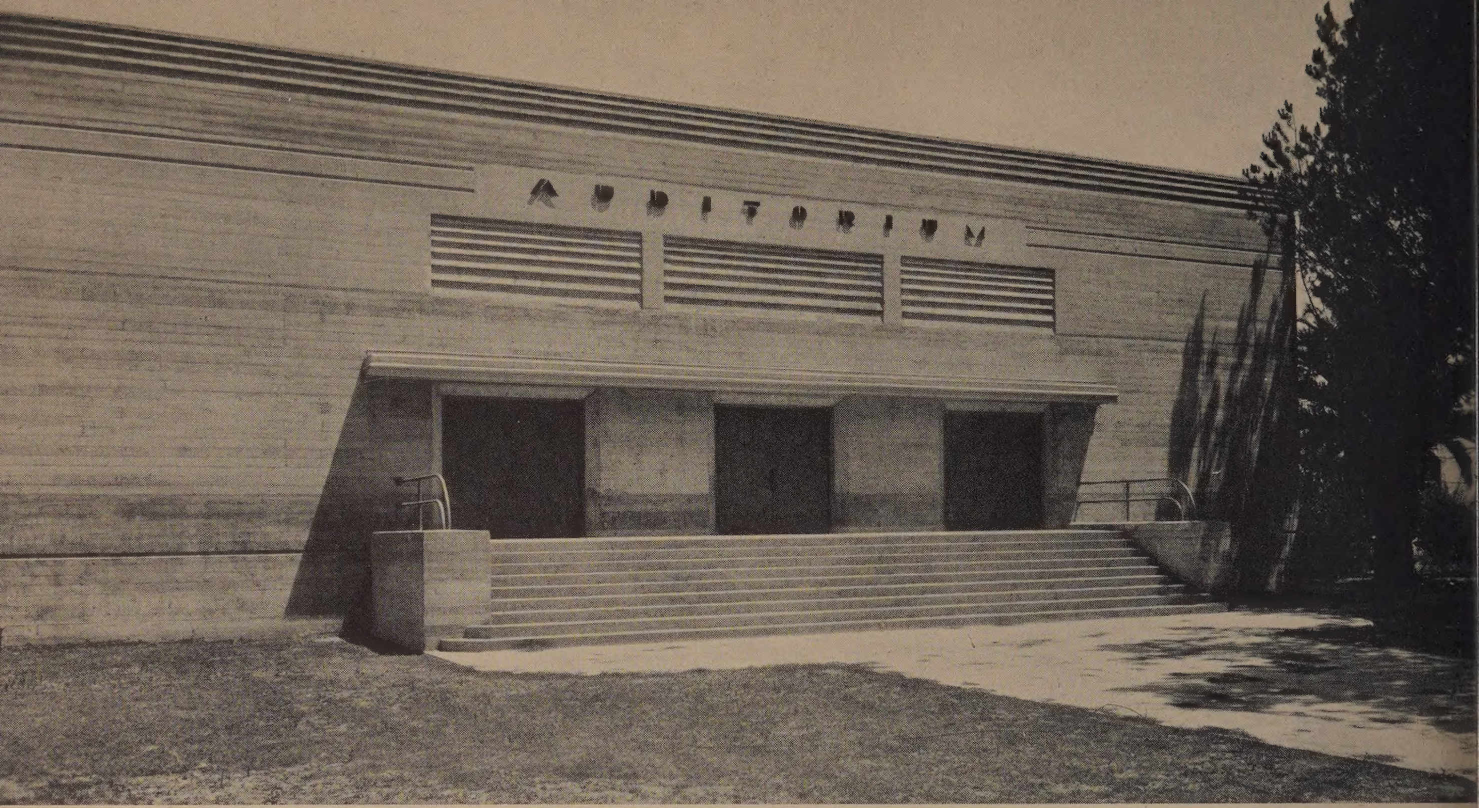
*Structural Engineer for the office of T. C. Kistner, Architect.



Vigorous horizontal detail and strong concrete textures characterize the main facade which will later be given a finish of cement paint.

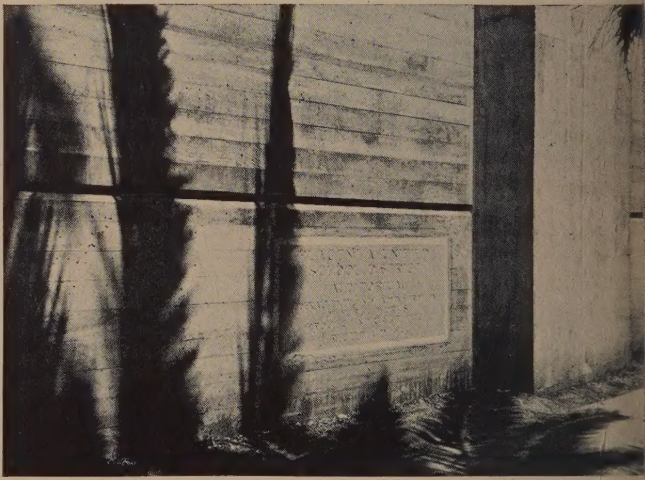
mainder of the roof load to the girders. These joists, also exposed, add further interest to the ceiling.

Roof framing was so designed that each girder has equal and symmetrical loads, and all columns are identical except for variations in depth at the haunch to facilitate architectural treatment of window levels above the sloping floor.

Although the hollow girders are relatively light for their bulk, they possess greater resistance to transverse rotational moments than do conventional solid girders. Substantial reduction in dead load and in dead load moments was effected by reducing the thickness of the webs or stems from a maximum of 12½ in. at the ends to a minimum of 6 in. at midspan. These webs are braced by the 6-in. uniformly thick top and bottom slabs of the girder and by five diaphragms. Stem thicknesses change at the diaphragms which are located on 13-ft. centers. The stems also vary 1½ in. in thickness from bottom to top as a result of an inward slope on their inner faces.

Reinforcing in each girder comprises six 1¼ in. square, deformed bars 78 ft. in length. Due to the closeness of the forms, splicing the bars would have been difficult.

Columns are 12½ in. thick at the sides, corresponding to the thickness of the girder stems at their junction. Inner and outer face slabs are 6 in. thick. Principal reinforcement was placed in the thick sides of the columns. Three rustication lines, which decorate the girder soffits, are carried down the inside face of the column to floor level.



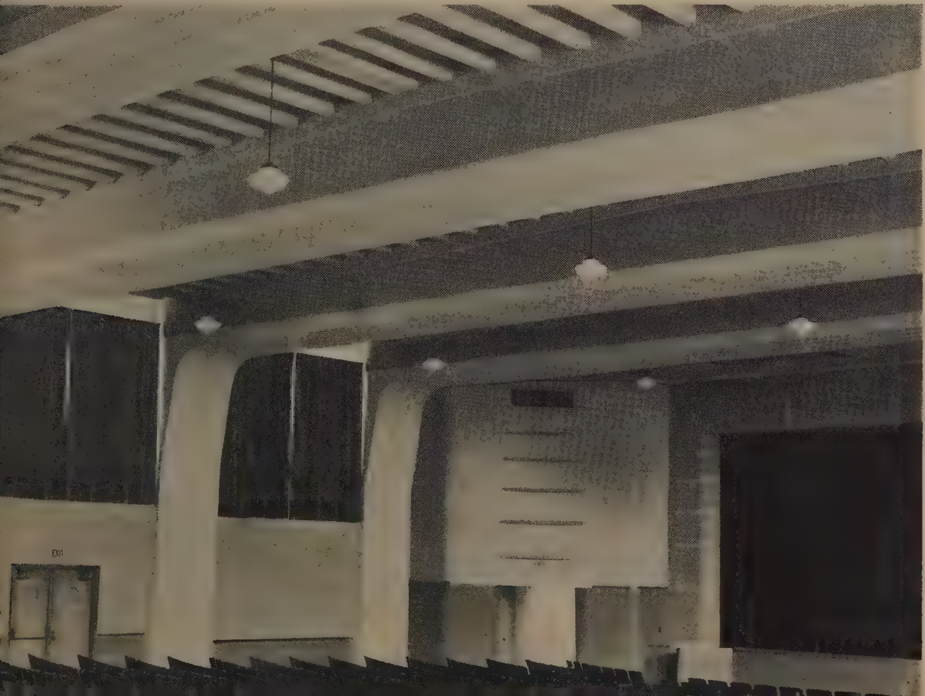
The sides of the building reveal an interesting contrast between rough form marks of the panels and the smooth-formed buttres

The frame was designed so that concrete could be placed continuously up to the level of the haunch, then the haunch and the bottom and sides of the girder, and finally the top slab which completes the girder and the roof.

Two lines of post shores, spaced 11 ft. on centers in each line, were erected under each girder on concrete pier footings. Continuous footings were placed and column steel erected. The interior form, made up of two sets of 24-in. metal pans with a wood spreader, was then placed in position as were the outer and side forms which had keyways

The com [illegible] exposed concrete surfaces. On the interior, the girders and columns have smooth surfaces, the result of plywood form liners. They are finished with a light-colored cement paint with part of the girder sides and wall panels given acous-

[illegible] was resident inspector for the Placentia Unified School District and for the architect. C. L. Wurster was general contractor. Total contract cost, exclusive of heating, stage electrical equipment and seats, was $70,200, or 23 cents per cu. ft.



Ceiling beams and joists, curving stage walls and proscenium—all in exposed concrete—combine to give an appearance of strength and dignity to the interior of Bradford School Auditorium.

Corporation, Richmond, Va. Concrete was chosen for its economy, also for its resistance to flood damage which is a constant hazard at this site. Edward F. Sinnott, architect; James Fox and Sons, contractors.

Built for Flood Protection

By Edward F. Sinnott, Architect

PLANT and offices of the Richmond Sand and Gravel Corporation, large dealers in materials for building construction and road-making, are located at 3011 Dock Street in lower Richmond, near the James River and excellent water and rail transportation. Everything would be perfect with the location were it not for floods which, frequently in recent years, have risen to create havoc with plant and office facilities. But the owners refuse to move away from their waterside site. Despite the annoyance, inconvenience and losses incurred by seasonal high water, they believe that the proximity to perfect transportation justifies the risk. In view of promised flood control measures, it would be costly to move away from a site that will be ideal once the old James is tamed and kept within its banks.

Meanwhile, however, there is the acute problem of maintaining an office that won't be completely wrecked and discommoded by rising waters. What was needed, the owners felt, was a building that can stand up under flood without more serious damage than muddy floors and walls. The solution was obvious—a reinforced concrete office building with solid foundations, walls and floors that could be washed out with a hose, dried and reconditioned withut great cost or need for repairs.

Architecturally the structure can be classified s modern. Detail is modest, confined to simple notifs that could be executed through the repeated use of forms—dentil bands at the coping, luted spandrels and shallow reveals. Smooth inish over the remainder of the wall surfaces vas obtained by the use of plywood form liners. ll details, as photographs indicate, were clean-ut, requiring very little rubbing to reveal the lesired finish.

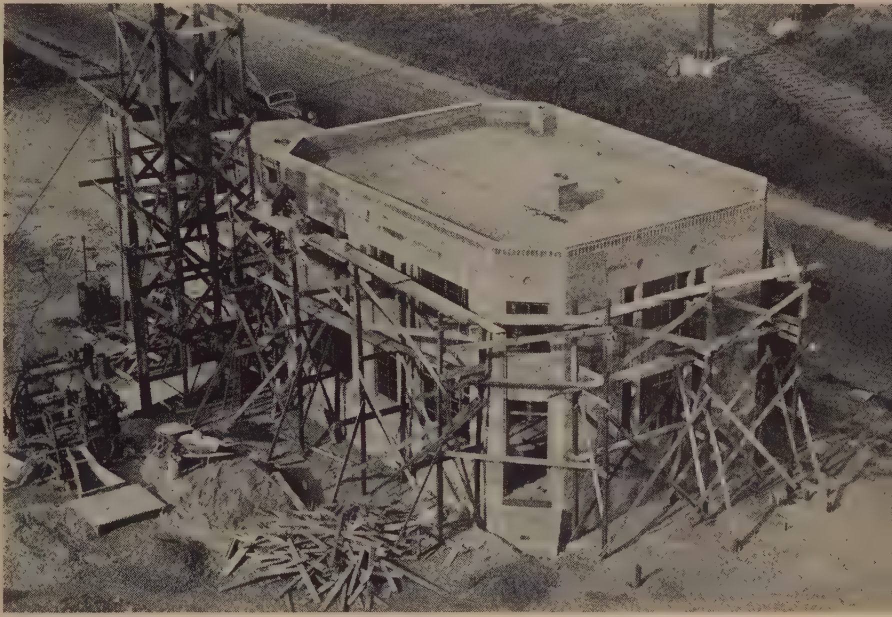
Interior trim and finish materials were elected for their ability to resist flood damage. he walls are plastered with portland cement laster, linoleum tile is placed over the concrete ub-floors and the furniture is all metal. The uilding is completely insulated and a first-class ir conditioning plant assures controlled temperature and humidity. All ceilings are treated vith acoustical tile.

A concrete monolith, the building is rated igh for its firesafety and resistance to flood lamage. For this reason insurance premiums on ire and flood risk are considerably lower than he average in the area in which the new building is located. Ordinary maintenance costs, likevise, will be kept to a minimum.

The building has been favorably received by oth building authorities and the public, and as created wide interest locally in architectural oncrete construction.

James Fox & Sons, general contractors of ichmond, were the builders. It required pproximately four months working time for rection and finishing, and cost approximately 17,000 including mechanical trades, air conlitioning plant and fixtures.

The building was erected in a lower part of Richmond, practically on the banks of the frequently overflowing James River.



This site, so near to water and rail transportation, was too convenient to abandon even though the area has been frequently flooded.

The interior of the office is finished in materials that vill not be permanently affected should flood waters nter the lower floor.

Architectural CONCRETE

ARCHITECT · ENGINEER · CONTRACTOR

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Reputation by Repetition

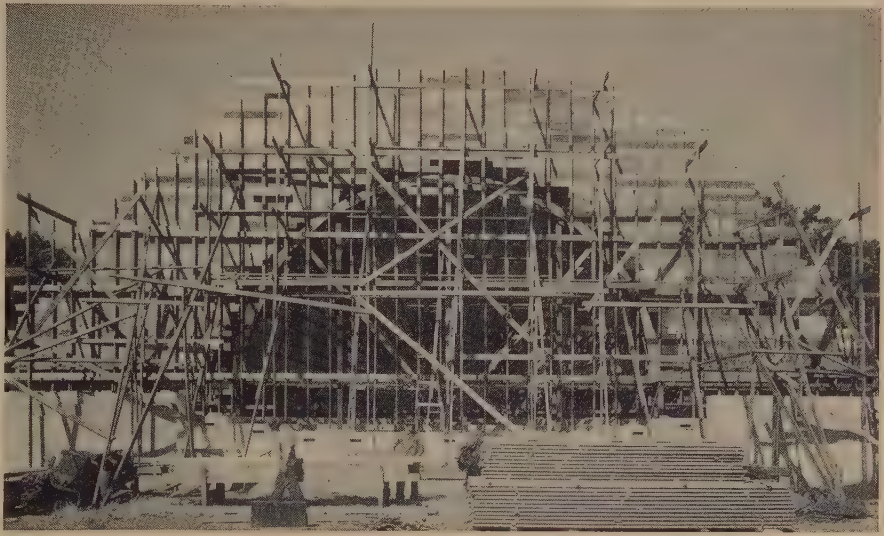
DIFFICULT to count accurately is the advertising value of a building to its owner: but none can deny the importance of the appearance of a commercial structure in gathering good will and recognition for the occupant and acceptance for his product or service. A grubby, inappropriate building has no appeal. Its appearance may, in fact, negate interest created by other costly forms of advertising. A clean-looking dairy building, a bright cheery packing house, a dignified office—all may symbolize efficiency of its occupants. Good architecture and sturdy construction is a "welcome" sign on any building.

But the advertising possibilities of building architecture can be carried to even more profitable ends than decent, inviting appearance. The chain stores long realized the value of immediate recognition of their establishments. They adopted uniform fronts—red, green, white, brown—colors and layouts as familiar and distinguishable as their trademarks. This is sight advertising of the most successful order. Why not apply it to commercial and industrial buildings generally?

Scores of manufacturing concerns are national in scope. They have factories, warehouses, packaging plants, bottling works in hundreds of cities—each a potential advertisement for the products and services they have to sell. Generally, however, these structures are lost in the welter of sameness that characterizes almost every manufacturing district; and often these buildings do not even identify themselves with suitable, visible signs. By choosing a distinctive material and a symbolic architecture of inviting appearance and applying them consistently to all of its far-flung properties, any business organization can reap the benefits of this first requisite of successful merchandising—recognition by repetition. And the first cost of such advertising is the last.

Since many business firms are expanding their properties now, it is the logical time to establish planned programs of merchandising by good architecture and good construction.

FORMS FOR CONCRETE BAND SHELLS



FORMS FOR BAND SHELL AT FT. DODGE, IOWA. HENRY L. KAMPHOEFNER, ARCHITECT; SAMUEL FULTON, SUPERINTENDENT OF CONSTRUCTION FOR WPA.

FORMING of curved surfaces, particularly those curved in two directions or tapered, present construction problems which, though not particularly difficult, are not encountered in straight wall work or ordinary building construction. A band shell that is essentially a half frustrum of a cone is a structure requiring curved and tapered forms.

Usually a band shell consists of an arch ring at the front of the cone, a vertical back wall that cuts the cone off near its apex, and the shell itself. In order to lay out the forms for a structure of this kind, a large flat area is desirable on which the different parts of the forms can be detailed full size. The area should be large enough so at least one-half of the entire outer surface of the cone can be developed into a flat plane.

Assuming that the foundation and stage of the structure have been completed, the first step in the form construction for the superstructure is to erect the soffit of the arch ring. Although curved, it presents no special problem, being simply a circular curve of constant radius.

The inside form of the back wall, which is just an ordinary flat wall form, is next erected. The top of the form is cut to the curvature of the smallest radius of the cone. Following the inside back wall form the inside form for the shell proper up to the springing line of the cone is erected. This is likewise simply a straight flat form built up in the usual way.

Rafters or joists to carry the inside form sheathing must then be erected. These rafters extend radially from the arch ring to the back wall, their ends being supported on circular ribbons (Fig. 1a) made of segmental pieces of 1x6 attached to the studs of the back wall form and the shores for the arch ring soffit. The segmental pieces are scribed to the right curvature on the layout floor and cut on a band saw.

With the rafters in position, provide intermediate supports (Fig. 1a) by bending short pieces of 1x6, generally making three laminations, to fit the contour of the cone. These short, slightly curved wales should be just long enough and so located as to receive the ends of two tie rods that hold the top form in position. The intermediate supports should be placed before any sheathing is put on and it may be desirable to cut in between the rafters some short pieces of 2x4 to help hold the proper curvature (Fig. 2).

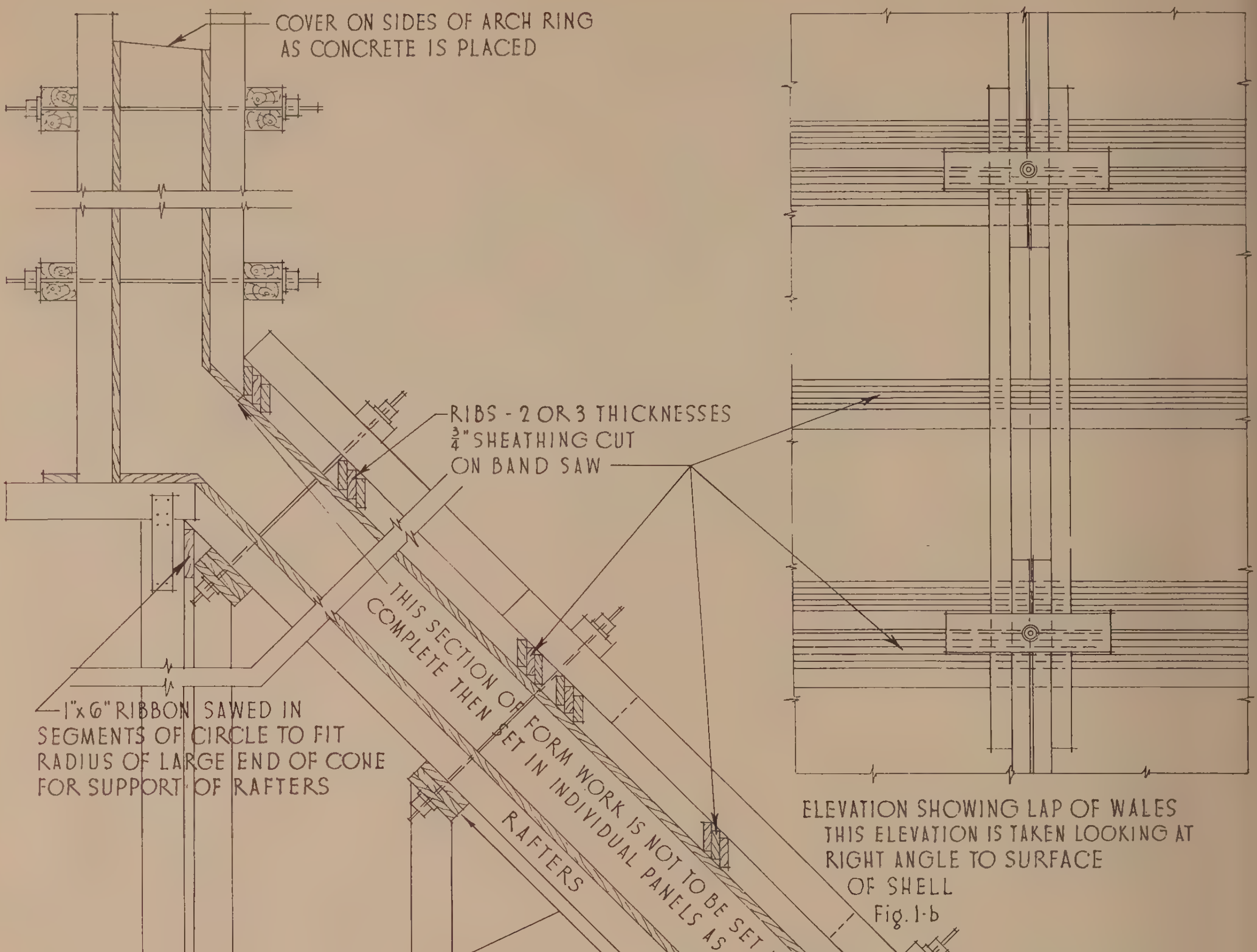
The sheathing is next bent over the rafters and securely nailed. Bending the sheathing tends to lift and push out the side walls so they should be securely anchored and tied across the cone. Some difficulty may be experienced in bending the sheathing to the curvature of the cone near the small end. Sheathing boards should be kerfed on the inside to facilitate bending. If plywood is used it may be necessary to build up the desired thickness with two or more layers.

If the front form of the arch ring has not been completed it should be erected next and then all joints should be pointed to prevent leakage. The forms should then be oiled and the reinforcing set.

The outside form of the shell up to the springing line of the cone and the back wall form should then be erected, the sheathing having first been oiled. The form is now ready for concrete up to the springing line but no concrete should be placed until the top form panels for the cone and the inside of the arch ring have been fabricated so they can be set in position as the concrete advances.

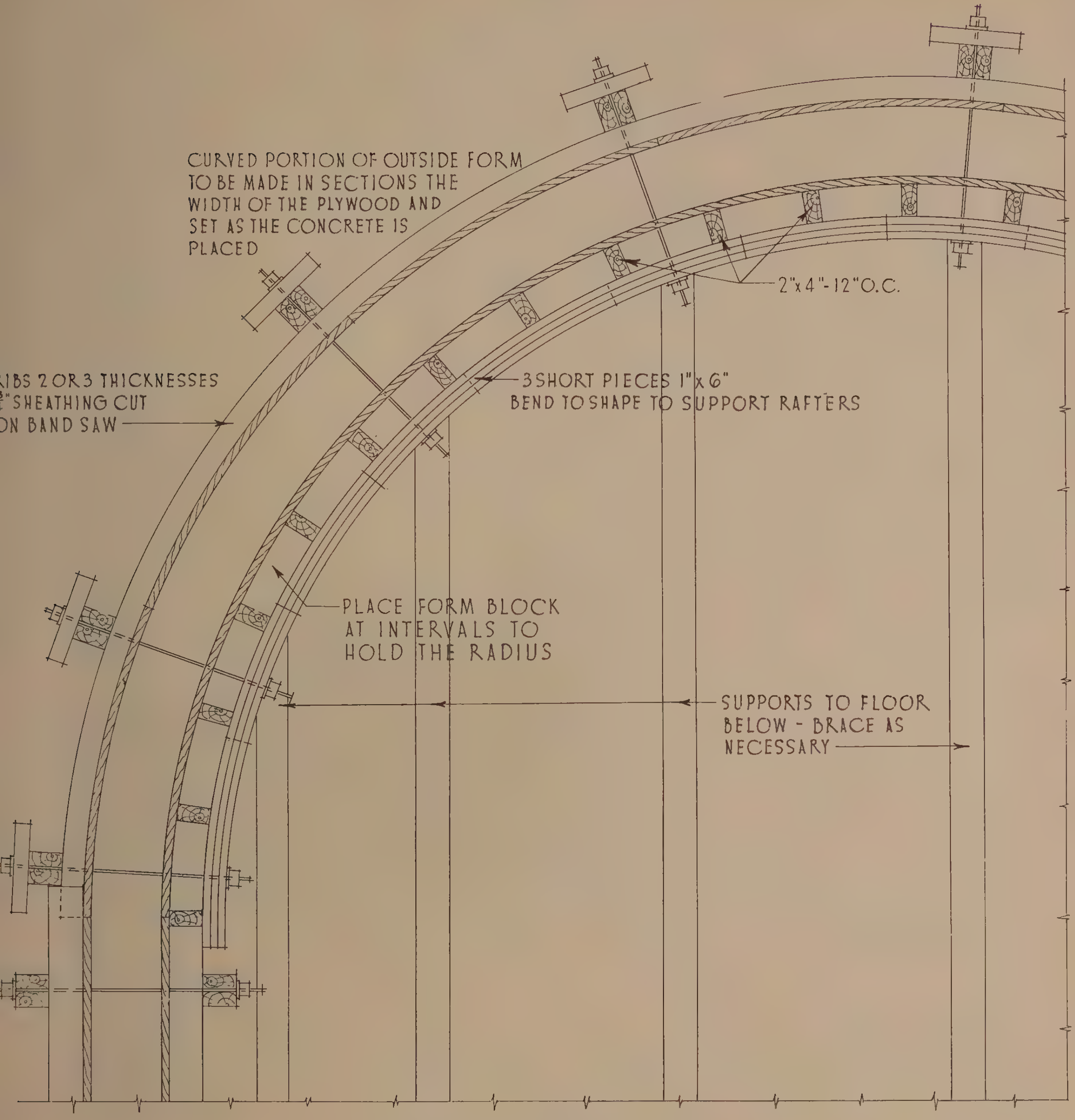
In order to determine the shape of the panels, the position of joints and the curvature of outside ribs, the outside surface of the cone should be developed as shown in Fig. 3a. One-half of the surface will suffice.

Notice that the joint lines are concentric and radial. If plywood is used for the outside form, and it will be the most convenient, the rectangular panels will have to be cut to the joint line pattern as illustrated. It is advisable to start laying out the panels from the center line as large as a standard plywood sheet will permit. In this way the radial


COVER ON SIDES OF ARCH RING AS CONCRETE IS PLACED
RIBS - 2 OR 3 THICKNESSES $\frac{3}{4}$" SHEATHING CUT ON BAND SAW
1"x6" RIBBON SAWED IN SEGMENTS OF CIRCLE TO FIT RADIUS OF LARGE END OF CONE FOR SUPPORT OF RAFTERS
THIS SECTION OF FORM WORK IS NOT TO BE SET UNTIL VERTICAL WALLS ARE COMPLETE THEN SET IN INDIVIDUAL PANELS AS CONCRETE IS PLACED
RAFTERS
3 SHORT PIECES 1"x6" BEND TO SHAPE TO SUPPORT RAFTERS
SUPPORTS TO FLOOR BELOW CROSS BRACE AS NECESSARY
1"x6" RIBBON SAWED IN SEGMENTS OF CIRCLE TO FIT RADIUS OF SMALL END OF CONE FOR SUPPORT OF RAFTERS

ELEVATION SHOWING LAP OF WALES
THIS ELEVATION IS TAKEN LOOKING AT RIGHT ANGLE TO SURFACE OF SHELL
Fig. 1-b

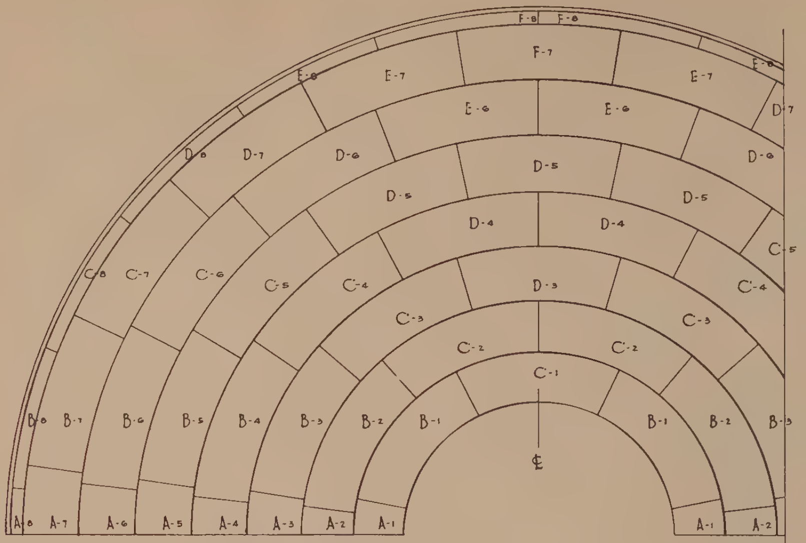
LONGITUDINAL SECTION OF SHELL
SECTION TAKEN ON CENTER LINE
Fig. 1-a



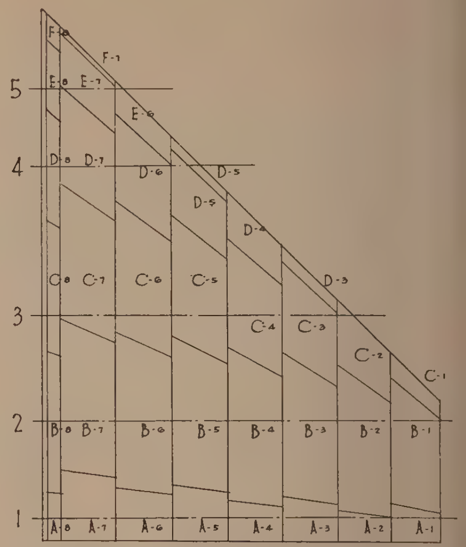
CROSS SECTION OF SHELL
SECTION TAKEN IN FRONT OF BACK WALL
Fig. 2

oints will be broken and it will be more convenient when lacing the concrete to start at the springing line with a ow of short panels. All the panels in each concentric row hown in Fig. 3a are the same size and shape except those marked *A*, which are cut to the same curvature but are ot full length.

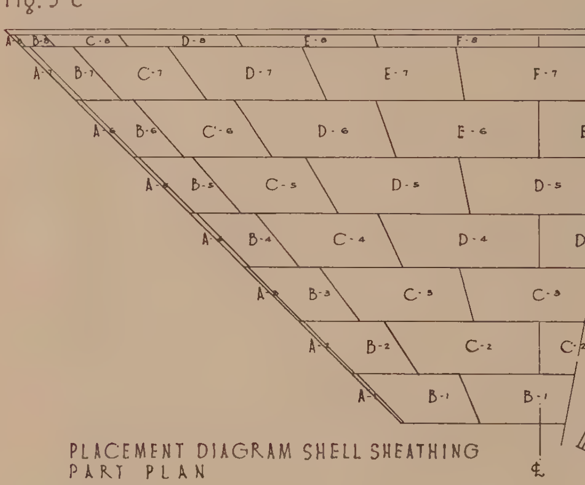
The outer ribs, consisting of three pieces of 1x6 (Fig. 1a and 2) are arranged in planes at 90 deg. to the axis of the cone. In other words, they are parallel to the concentric joint lines between the sheathing panels. The ribs are scribed on the layout floor to the proper radius which increases from the back wall to the arch ring and are cut out on a band saw. They are located at each side of the concentric joint lines and at the center of the panels and are cut



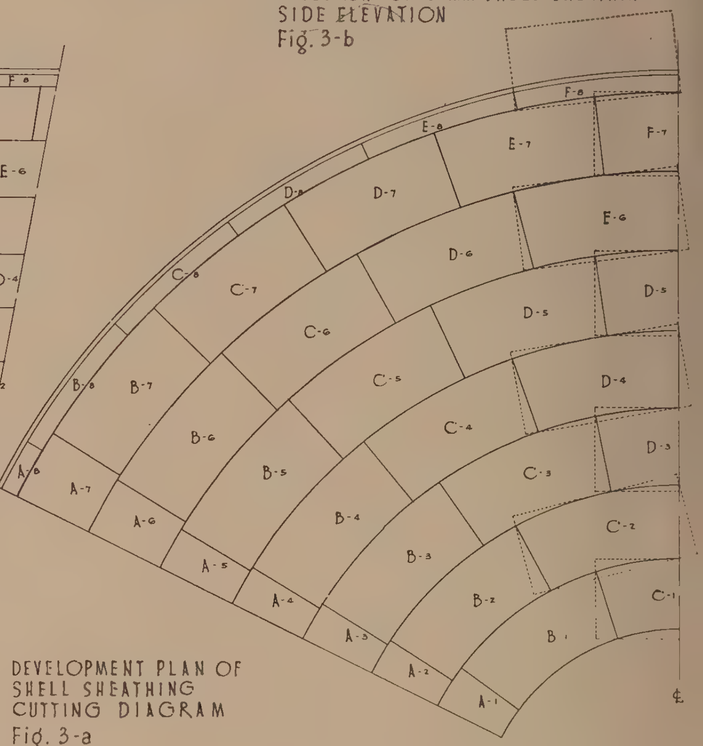
PLACEMENT DIAGRAM SHELL SHEATHING
PART REAR ELEVATION
Fig. 3-c



PLACEMENT DIAGRAM SHELL SHEATHING
SIDE ~~ELEVATION~~ ELEVATION
Fig. 3-b



PLACEMENT DIAGRAM SHELL SHEATHING
PART PLAN
Fig. 3-d



DEVELOPMENT PLAN OF
SHELL SHEATHING
CUTTING DIAGRAM
Fig. 3-a

the length of the plywood panel which is nailed to them.

The outside wales should not be more than 12 in. longer than the width of a panel in order not to interfere with the placing of adjoining panels. By lapping the wales as shown in Fig. 1a, one tie will hold the ends of the two sets of wales.

To be sure that all panels will fit in their respective places, forms should be erected and the panels given identifying marks. Any necessary fitting can be done at this time, after which panels can be set aside and the placing of the concrete started. A marking system like that shown in Fig. 3a will be convenient. Note that panels *A*, *B*, *C*, etc. appear in each of the three assembly drawings Fig. 3b, c and d. All of the *A* panels are erected first, then as the placing of the concrete approaches the broken line *1-1* the *B* panels are set and so on until completion of the concreting.

Motor
tical in exterior design and similar in plan, they were designed by the State Department of Architecture, George B. McDougall, State Architect.

Twin State Buildings—Sacramento

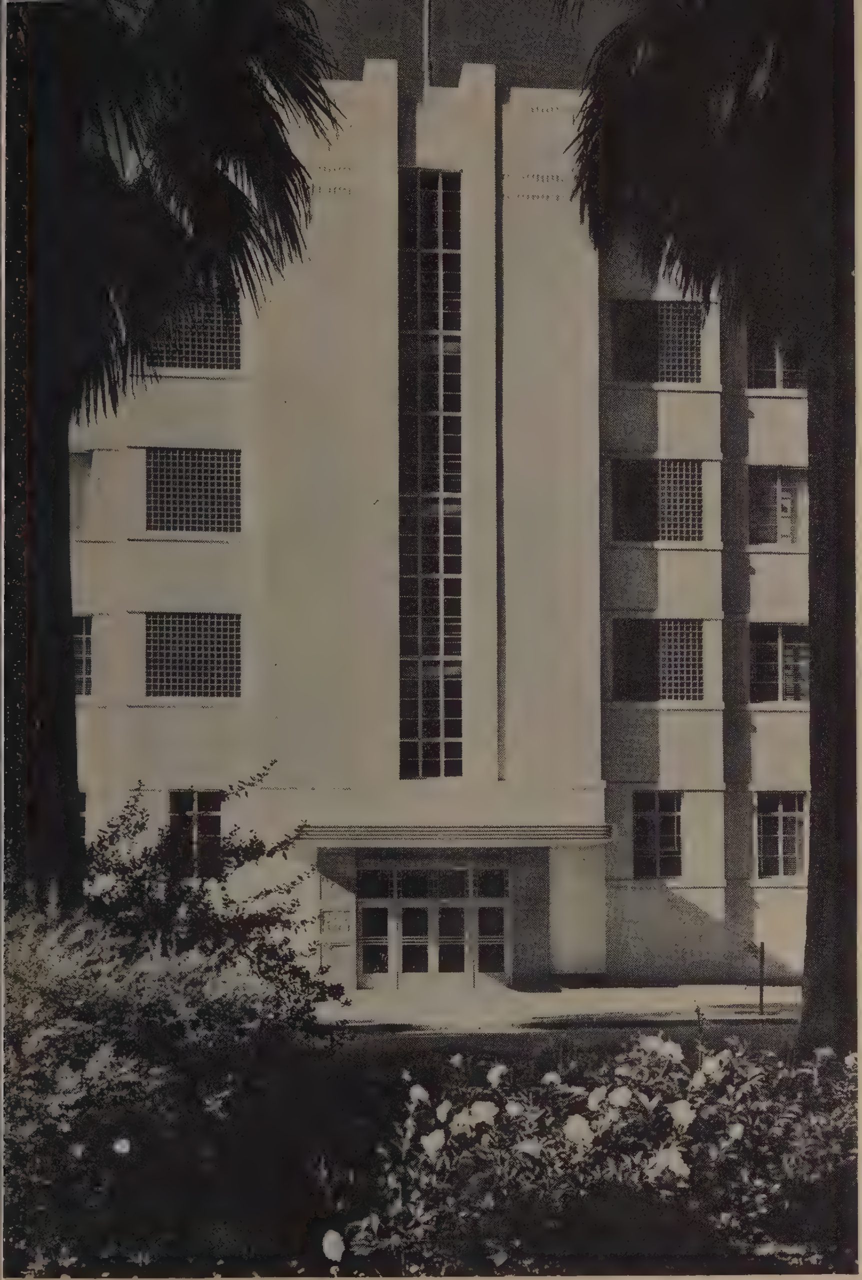
By George B. McDougall, A.I.A., State Architect

BOLDLY different from the Capitol structures which house the government and legislature of the State of California, are two new state office buildings recently completed at Sacramento. Unlike the decorative, monumental structures which symbolize the seat of government, these twin monoliths are frankly office structures, designed as efficient, convenient workshops. Straight lines, wide window areas and unencumbered floor areas characterize these buildings built for and occupied by the Departments of Motor Vehicles and Public Works, respectively.

Crowded conditions in the old building jointly occupied by both departments and their sub-divisions made some new office construction necessary. Rapid expansion of the work of both departments made it economical to erect separate buildings for each so that technical planning and research work could be carried on efficiently with the best facilities possible. A plan was thereby worked out by the State Finance Department under which the equities the two departments they are highly fire and earthquake-resistive.

and passed through a pre-cooling system, cooled by well

The buildings have an H-shaped plan above ground level to gain maximum daylight on all sides. Both are air conditioned for year 'round comfort. Modern structures with wide window areas, they frankly reveal their function —efficient, convenient workshops.



water at 62½ deg. and thence through direct expansion refrigerator units. In winter, the conditioned air is preheated by well water just as it is precooled in summer, then steam-heated and delivered to the rooms at 70 deg. To counteract direct solar radiation, the composition roofing is coated with aluminum paint and 4 in. of diatomaceous earth is provided in the attic.

Ground floors of both buildings are used as garages for officials' motor cars, rooms for air conditioning and heating equipment and storage. In the Public Works building an assembly room is located on the first floor to accommodate the public at hearings. In the Motor Vehicle building quarters are provided for 24-hour use by the Highway Patrol with isolated sound insulated rooms for radio transmitting. A tall radio tower rises 134 ft. above this structure.

The Motor Vehicles and the Public Works buildings were ready for occupancy by January and June, 1937, respectively, and the departments moved into convenient, spacious quarters for the first time in many years. These buildings, which meet all the requirements of the public services divisions, will provide ample space for expansion of their works.

Dominating the center of each structure is a wide, projected stairwell with a continuous vertical panel of glass. Adding interest in the design are the areas of glass brick on both sides of the central motif.

The main floor lobby in each building has a durable terrazzo floor. Walls here are finished in marble.

SCHOOL BUILDING FRAME DESIGNED BY Principle of Continuity

A BUILDING with architectural concrete walls, concrete floors and frame is a monolithic structure that acts as an integral unit. Beams and columns should not be designed as if they were articulated members but should be treated as a *continuous frame*, advantage being taken of the actual continuity of the construction. No choice in regard to type of design is left for the designer to make if he adheres to one of the recently adopted building regulations* according to which moments and shears in continuous frames must be determined by the principle of continuity.

Schools, hotels, hospitals and similar buildings—built with wide outer bays and a central narrow corridor—present one of the most common cases for which the old arbitrary design coefficients give too inaccurate results, and for which a design by the principle of continuity is desirable. The analysis of a building of this type will be discussed in some detail in connection with design of a typical school building.

Fig. 1 is a *framing plan* for two wide outer spans and a narrow corridor span assumed to be symmetrical about the center line of the corridor. The plan is adaptable to the typical school building layout shown in "*Concrete in Schools*,"** page 10. Partitions separating classrooms are carried on 32 in. wide joist formed by omitting one row of the 6-in. metal pans used to form the standard floor joists.

The *loads* recorded below need no explanation except that they have been determined for two types of joists, narrow joists 26 in. o.c. and wide joists under partitions. Throughout the analysis each type will be kept separate.

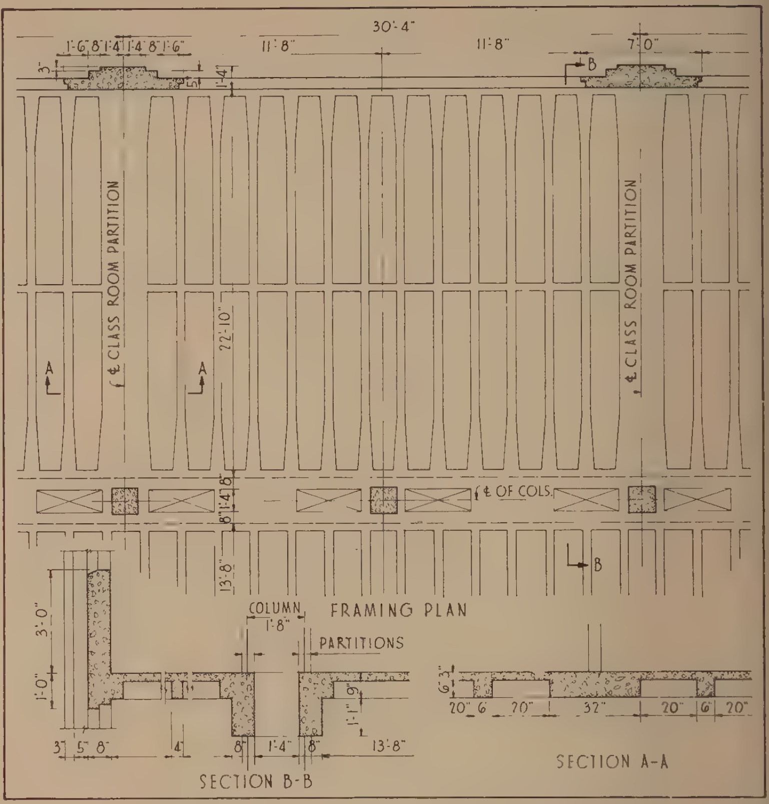


Fig. 1. Framing plan for typical school building layout.

Loads per lin. ft. of joists 26 in. o.c.	
Dead Load (D.L.)	152 lb.
Live Load (L.L.)	108 lb.
Total Load (T.L.)	260 lb.

Loads per lin. ft. of wide joists	
Dead Load (D.L.)	700 lb.
Live Load (L.L.)	220 lb.
Total Load (T.L.)	920 lb.

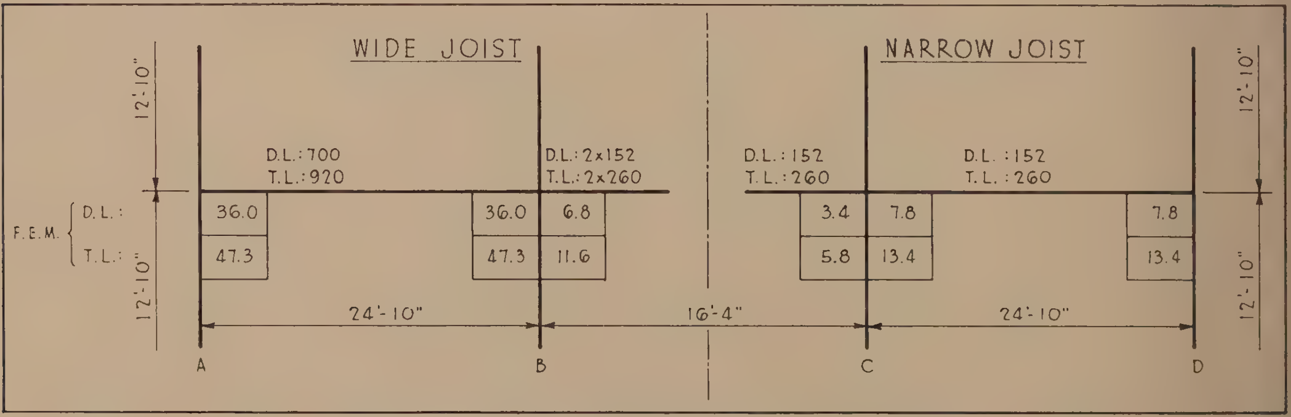


Fig. 2. Loads and "fixed end moments" in two types of floor joists.

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*1936 Building Regulations of the American Concrete Institute and the report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete, 1937.

**"*Concrete in Schools, Educational and Architectural Planning*" available free upon request to Portland Cement Association.

Fixed End Moments and Stiffnesses

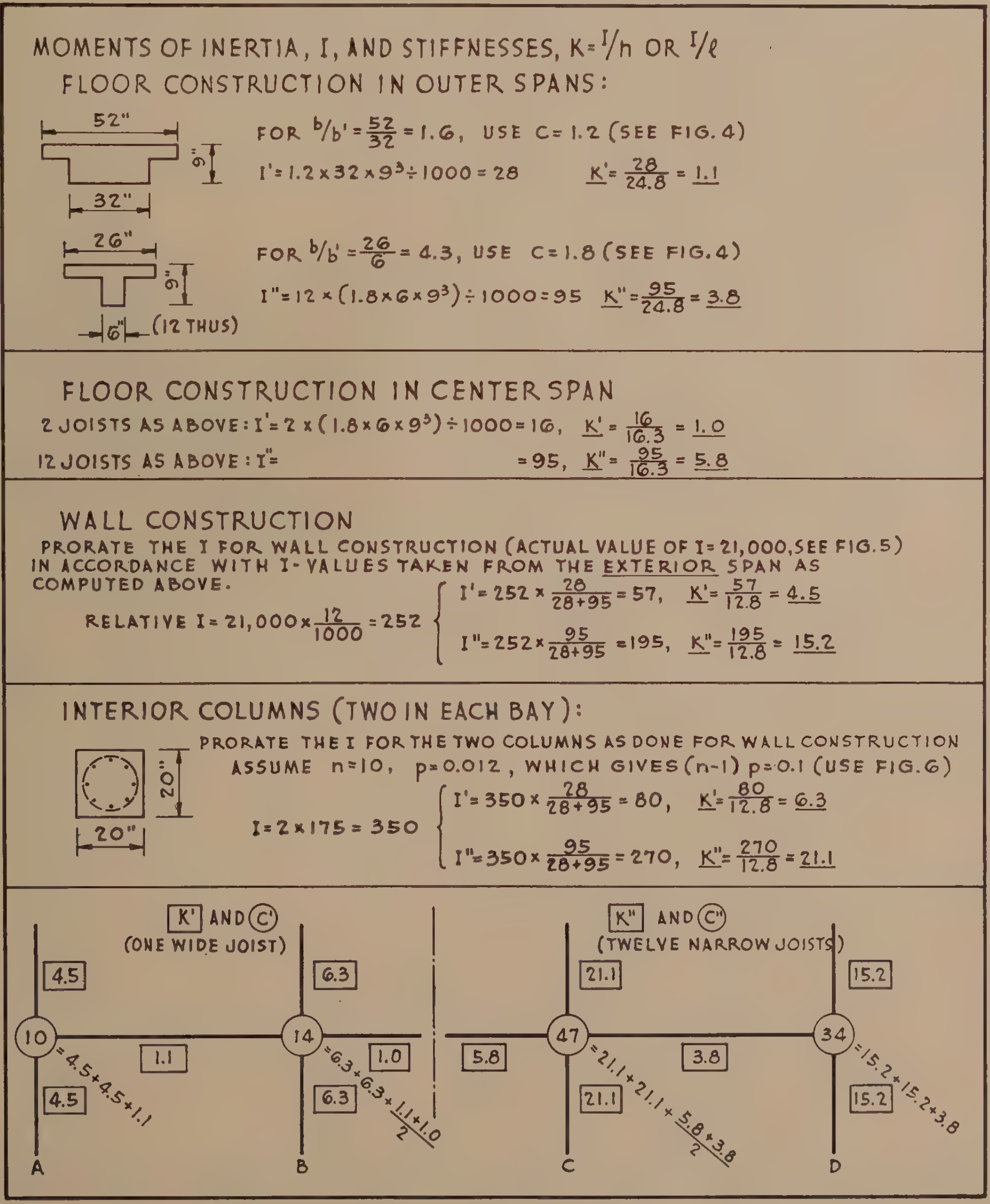
In most methods of frame analysis, beams are first considered to be fixed at the ends. This is an artificial condition that does not actually exist, but it is a convenient starting point. The *fixed end moments* for uniformly distributed loads*** are computed by the formula $1/12\ wl^2$ and are recorded in Fig. 2 in the boxes at the ends of the beams. Note that the fixed end moments are given for D.L. and T.L. separately, and that the left half of the figure shows the loads and moments for a wide joist, the right side for a narrow joist.

To analyze a frame, it is necessary to know the *moments of inertia*, I, of the beams (or joists) and columns in order to determine the stiffnesses: $K=I/h$ for columns, and $K=I/l$ for beams. According to the A.C.I. code, 1936, I of beams may be based on entire concrete section neglecting the reinforcement, and I of columns may be based on the entire concrete section including the transformed steel area.

In Fig. 3, moments of inertia ("prime" for wide joist, "double prime" for narrow joists) are relative values, the I for rectangular sections being taken as $bd^3/1000$ (absolute value $= bd^3/12$). For the joists, I is computed for the web and allowance made for the flange by multiplying by a factor that depends upon the ratio of flange width, b, to web width, b'. The factor, c, may be taken from Fig. 4.

Having determined the moments of inertia of the wide joist and the twelve intermediate narrow joists in the outer spans, the relative stiffnesses, K' and K'', are obtained by dividing I' and I'' by the span length taken from center to center of columns. For the short center span, the I and K-values are similarly computed, first for the two joists which are continuous with the wide joist in the outer span, and then for the twelve other joists in the bay.

There is one wall column—$I=21{,}000 \times 12/1000=252$—for each bay (see Fig. 5) consisting of one wide joist ($I=28$) and twelve narrow joists ($I=95$). It will be assumed that the $I=252$ may be prorated to the two types of joists in proportion to their I-values: $I'=57$ to wide joist, and $I''=195$ to narrow joists. Dividing by the story height, $h=12.8$ ft., gives the corresponding stiffnesses, K' and K''.



MOMENTS OF INERTIA, I, AND STIFFNESSES, $K={}^{I}/h$ OR ${}^{I}/\ell$

FLOOR CONSTRUCTION IN OUTER SPANS:

FOR $^{b}/_{b'}=\frac{52}{32}=1.6$, USE $C=1.2$ (SEE FIG. 4)

$I'=1.2\times 32\times 9^3\div 1000=28$ $\quad \underline{K'}=\frac{28}{24.8}=\underline{1.1}$

FOR $^{b}/_{b'}=\frac{26}{6}=4.3$, USE $C=1.8$ (SEE FIG. 4)

$I''=12\times(1.8\times 6\times 9^3)\div 1000=95$ $\quad \underline{K''}=\frac{95}{24.8}=\underline{3.8}$

FLOOR CONSTRUCTION IN CENTER SPAN

2 JOISTS AS ABOVE: $I'=2\times(1.8\times 6\times 9^3)\div 1000=16$, $\quad \underline{K'}=\frac{16}{16.3}=\underline{1.0}$

12 JOISTS AS ABOVE: $I''=\ =95$, $\quad \underline{K''}=\frac{95}{16.3}=\underline{5.8}$

WALL CONSTRUCTION

PRORATE THE I FOR WALL CONSTRUCTION (ACTUAL VALUE OF I=21,000, SEE FIG. 5) IN ACCORDANCE WITH I-VALUES TAKEN FROM THE EXTERIOR SPAN AS COMPUTED ABOVE.

$$\text{RELATIVE } I=21{,}000\times\frac{12}{1000}=252\begin{cases} I'=252\times\frac{28}{28+95}=57, & \underline{K'}=\frac{57}{12.8}=\underline{4.5} \\ I''=252\times\frac{95}{28+95}=195, & \underline{K''}=\frac{195}{12.8}=\underline{15.2}\end{cases}$$

INTERIOR COLUMNS (TWO IN EACH BAY):

PRORATE THE I FOR THE TWO COLUMNS AS DONE FOR WALL CONSTRUCTION ASSUME $n=10$, $p=0.012$, WHICH GIVES $(n-1)\,p=0.1$ (USE FIG. 6)

$$I=2\times 175=350\begin{cases} I'=350\times\frac{28}{28+95}=80, & \underline{K'}=\frac{80}{12.8}=\underline{6.3} \\ I''=350\times\frac{95}{28+95}=270, & \underline{K''}=\frac{270}{12.8}=\underline{21.1}\end{cases}$$

Fig. 3. Determination of moment of inertia, I, and stiffness K=I, of members in frame.

***For other types of loading, coefficients for fixed end moments may be obtained from "*Continuity in Concrete Building Frames*" available free upon request to Portland Cement Association.

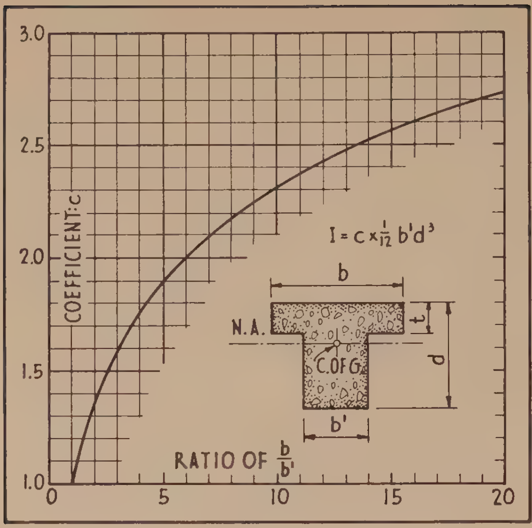
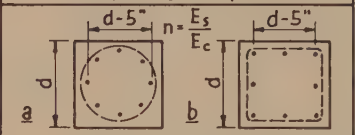


Fig. 4. Curve representing effect of flange upon moment of inertia of T-shaped sections.

MOMENTS OF INERTIA OF COLUMNS

d×d	(n-1)p 0.0	0.2	0.4	0.6	0.8
12×12	21	-	-	-	-
14×14	38	43	48	52	57
16×16	66	75	85	94	103
18×18	105	120	140	150	170
20×20	160	190	210	240	270
22×22	234	280	320	360	400
24×24	332	390	460	520	580
26×26	457	550	640	730	820
28×28	615	740	860	990	1110

$$I = \frac{1}{1000} \times \left[d^4 + \frac{12}{8}(n-1)pd^2(d-5)^2\right]$$



a: $p = A/d^2$ (A: AREA OF ALL BARS SHOWN)
b: $p = 4A'/d^2$ (A': AREA OF BARS AT ONE FACE)

Fig. 6. Moment of inertia of columns reinforced with spirals or ties.

Moment of inertia of the two interior columns per bay may be obtained from Fig. 6 when the side dimension, $d = 20$, and the value of $(n\text{-}1)p$, equal to 0.1, are known. The I for the two columns, 350, is prorated in Fig. 3 in a manner similar to that used for the wall column, and K' and K'' are then computed.*

The resulting K-values for *all* members are shown in the boxes in the sketch in Fig. 3. The circles at each joint enclose figures, denoted as C-values, which equal the sum of the K-values for the columns above and below plus the *average* values of K for adjacent beams.

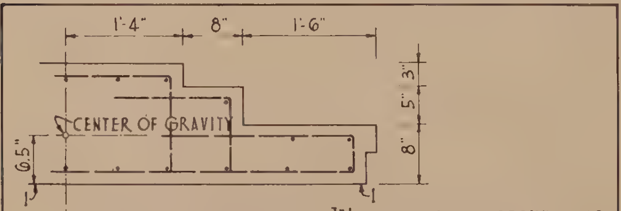
From the fixed end moments, K and C-values recorded in Figs. 2 and 3, the moments and shears in the columns and joists may be obtained by simple arithmetic.**

Moments and Shears in Floor Construction

The ten sketches in Fig. 7 show the maximum and minimum moments that are to be determined and also the position of the live load which will produce the desired moment and shear at the points indicated. For each point, the loading indicated is part of a "loading pattern" or arrangement of live load on several spans on several floors required to produce absolute maximum (or minimum) moment and shear. For ordinary cases, similar to the frame being analyzed, only the loading on the small part of the frame shown need be considered for satisfactory accuracy.

Fig. 8 is a convenient standard form for computing the moments and shears at points indicated in Fig. 7. The procedure is, briefly, to apply to the fixed end moments two corrections, each of which depends upon (1) unbalanced moments (algebraic sum of fixed end moments), and (2) relative stiffness of columns and floor construction, (K and C-values). For illustration, in order to determine the moment at the outer end of the wide joist as in Fig. 8a, the fixed end moment at A (M^F_L) is reduced by the product of unbalanced moment (U_A) times $\frac{K}{C_A}$ and is increased by ½ the product of unbalanced moment (U_B) times $\frac{K^*}{C_B}$.

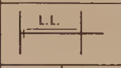
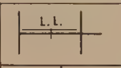
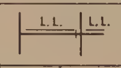
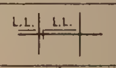
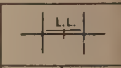
The moment, -43.7, obtained as the algebraic sum of three terms, is at the center line or axis of the column and must be reduced to give the moment at the face of the



VERTICAL REINFORCEMENT: $\frac{7}{8}$"φ 3000 LB. CONCRETE n=10
TRANSFORMED AREA: A = 1127
STATICAL MOMENT: $Q_1 = 7360$
MOMENT OF INERTIA: $I_1 = 69{,}100$
DISTANCE TO C.OF G.: $\bar{y} = \frac{Q_1}{A} = \frac{7360}{1127} = 6.5$ IN.
$I = I_1 - \frac{Q_1^2}{A} = 69{,}100 - \frac{7360^2}{1127} = \begin{Bmatrix}+69{,}100\\-48{,}100\end{Bmatrix} = 21{,}000$

Fig. 5. Determination of I of transformed section taken through wall column.

MAXIMUM MOMENTS IN JOISTS (FT. k.)

 L.L.		 L.L.		 L.L. L.L.		 L.L. L.L.		 L.L.	
W	N	W	N	W	N	W	N	W	N
-39.2	-11.0	+25.7	+7.3	-37.6	-10.8	-9.9	-4.9	+4.9	+2.8

MINIMUM MOMENTS IN JOISTS (FT. k.)

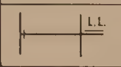
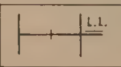
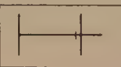
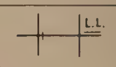
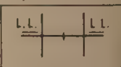
 L.L.		 L.L.				 L.L.		 L.L. L.L.	
W	N	W	N	W	N	W	N	W	N
-29.6	-6.3	+19.5	+4.2	-28.4	-6.4	-5.6	-2.5	+1.9	+1.1

Fig. 7. Summary of moments at various points in two types of joists.

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*In prorating the value of $I = 350$ to the two types of joists it should be noted that the distribution of the 350 is influenced by the floor construction not only in the outer span but also in the center span. In designing the long outer span in this example, the effect which the center span construction has upon the distribution of I of the column is small, however, and will be disregarded.

**A complete discussion of the analytical procedure used here is given in "*Continuity in Concrete Building Frames.*"

*The quantity of $\frac{1}{2}U_B \times \frac{K}{C_B}$ represents moment carried over to A when joint B is allowed to rotate. For further explanation see "*Continuity in Concrete Building Frames.*"

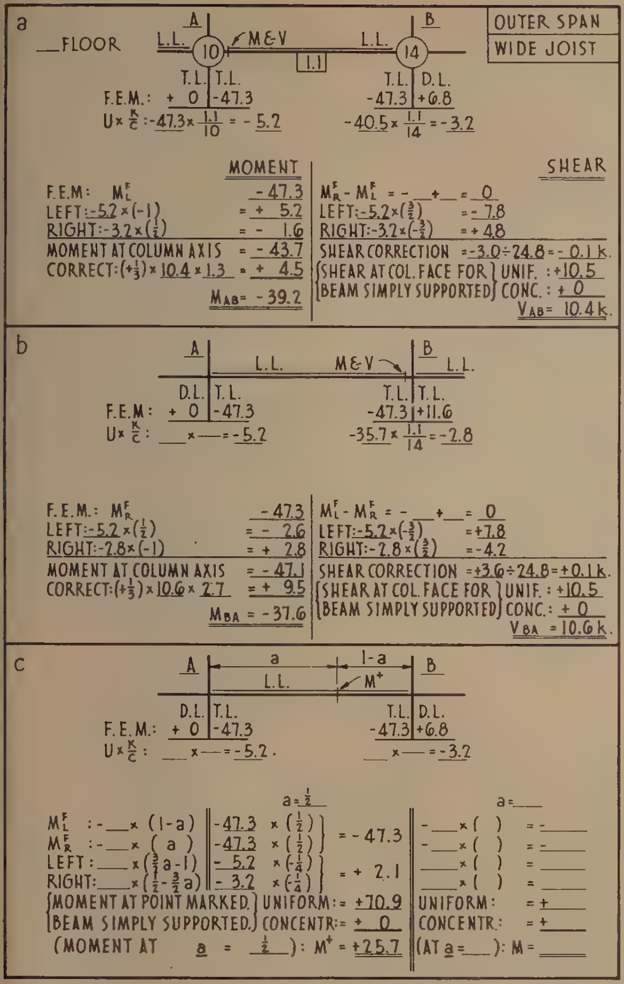

Fig. 8. Standard computation form for determination of moments and shears in beams. Standard forms may be reproduced by copying this figure omitting the calculations.

column, −39.2 ft.k. The reduction is 1/3 Va, in which $V=10.4$ is the end shear at the point considered, and $a=1.3$ is the width of column. The end shear, computed in Fig. 8a, is composed of the shear in the beam considered simply supported, +10.5, plus a correction due to the continuity, −0.1.

Fixed end moments, K and C-factors required for use in Fig. 8 and in similar computation forms for other beams may be obtained from Figs. 2 and 3. The final moments determined in Fig. 8 are summarized in Fig. 7 under W (denoting wide joist) and N (narrow joist) together with other maximum and minimum moments at points of critical stress determined in a similar way. These moments have been plotted in Fig. 9.

Moments in Columns

Just as the restraining effect of the columns influences the end moments in the joists, so the deflection of the joists creates moments in the columns. These moments must be combined with the axial load and the combined stress determined.

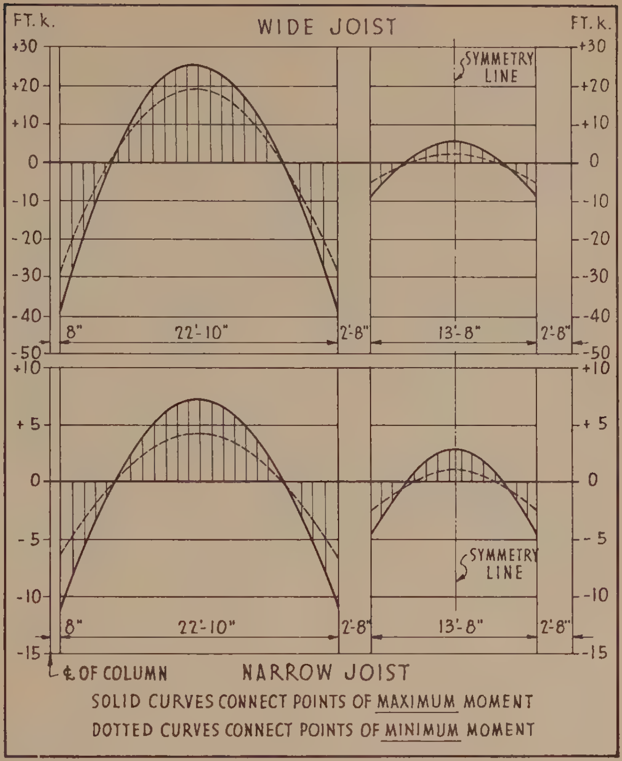

Fig. 9. Curves connecting points of maximum and minimum moment.

Fig. 10 is a convenient form for calculating column moments. The fixed end moments, K and C-factors are taken from Figs. 2 and 3, as for the joists, and recorded as shown in Fig. 10. From these values the moments in the *interior* columns have been obtained by multiplying the unbalanced moment (difference between numerical values of fixed end moments) by K/C. For *exterior* columns in Fig. 10, the product of $U\text{x}K/C$ is multiplied by factor 4/3.*

Below the sketch in Fig. 10, the total column moments are computed. From these values combined with axial loads combined stresses in the columns may be determined.

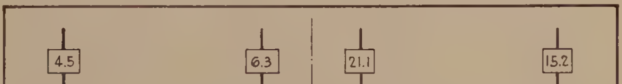

Fig. 10. Computation of moments in columns.

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*The product of U x K/C represents moment in columns assuming that the "far" joints (above and below) are fixed. This assumption is satisfactory for interior columns but gives too small a moment for exterior columns. In the latter, therefore, U x K/C is multiplied by 4/3. For further discussion, see "*Continuity in Concrete Building Frames.*"

Jail for Lynchburg, Virginia

By C. H. Hinnant

THERE have been many new concrete jails and prisons erected throughout the South in recent months, but the first of that type of construction in Virginia is the municipal jail recently completed at Lynchburg. It replaces a century-old jailhouse, a structure typical of old ideas about prisons and it looked the part. The new building, therefore, is an innovation in this old Virginia town.

When plans were announced, revealing the location of the new jail in a residential section, nearby residents must have been alarmed over the proximity of a building of such unsavory occupancy. If there was that fear, it has been dissipated with the completion of the new jail for, although it is the most modern prison in the state, equipped with the latest devices for safely detaining rogues and malefactors, its appearance is far from that of the conventional jail. In fact, this building, which has the characteristics of a small office structure more than anything else, actually improves the appearance of the locality in which it stands. Even the window bars, traditional mark of all jails, are disguised in the treatment of the fenestration.

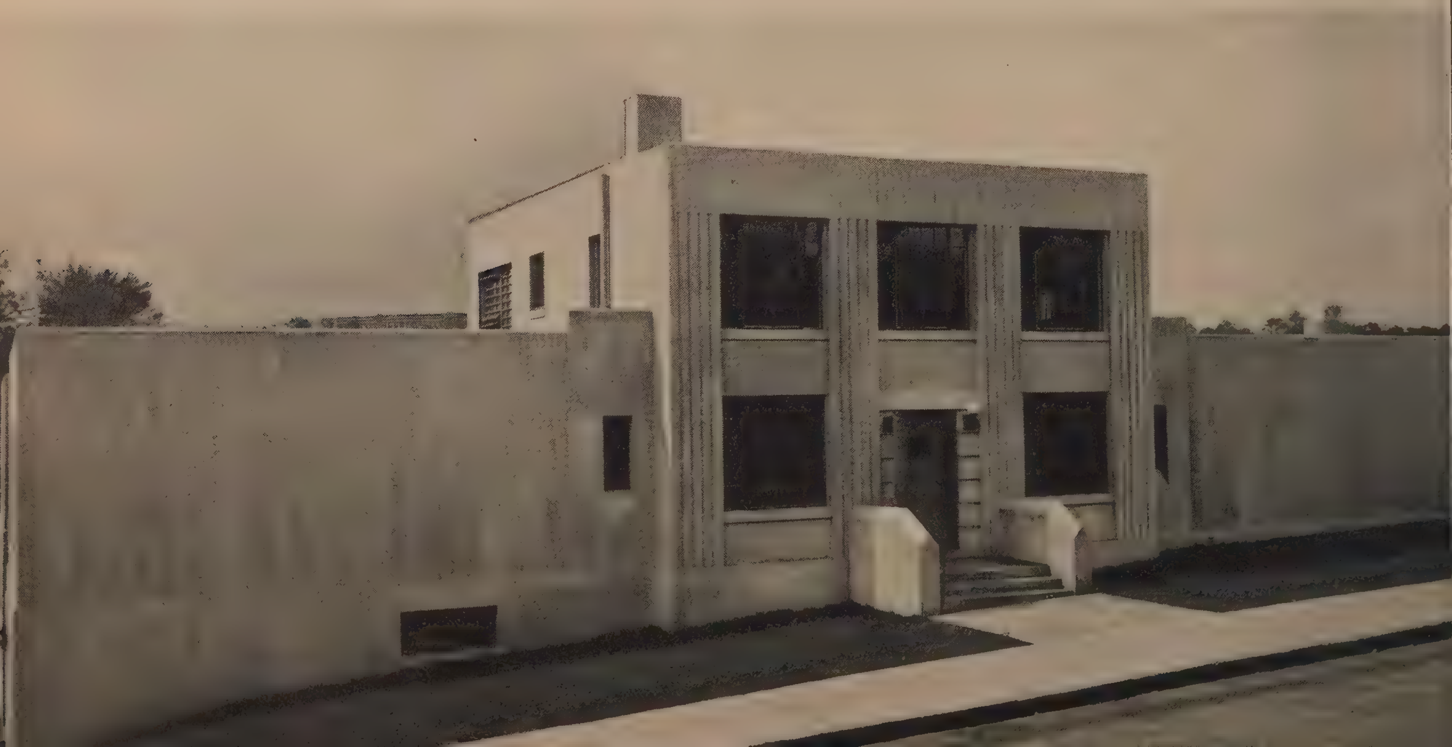
Simplicity characterizes all facades of the Lynchburg jail. Plane surfaces are carefully broken by balanced arrangement of openings where windows are needed. The windows giving light to the cells are wide, not narrow, barred slits in the walls. Decorative detail, in keeping with the balanced mass of the structure and with the need for economical construction, is kept to a minimum of formed fluting on four front columns and reveals about the entrance.

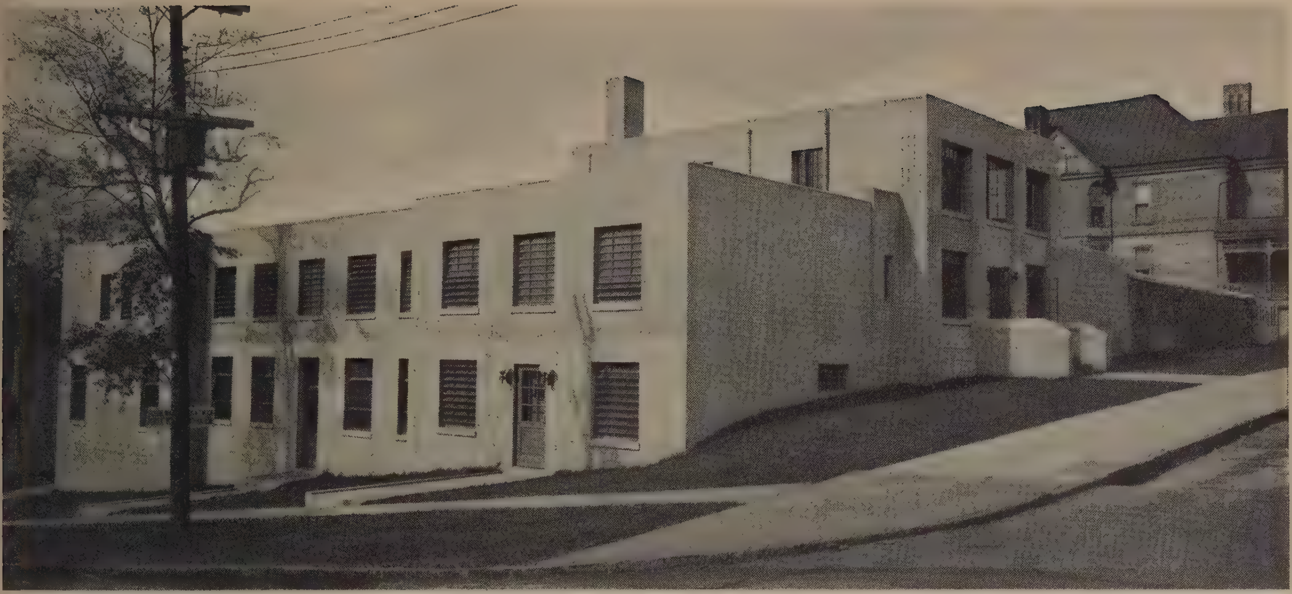
The building was designed as a concrete monolith with floor and ceiling slabs cast integrally with the walls and partitions. With cell work securely anchored to the concrete, Lynchburg jail is practically escape-proof. It is naturally firesafe and easy to maintain in the most sanitary condition.

Assurance of strength and durability was obtained by the use of carefully graded aggregates and not to exceed 7 gallons of water to a sack of cement. The specifications required the concrete surfaces to be rubbed; however, little rubbing was necessary, since the forms stripped clean and few blemishes were visible.

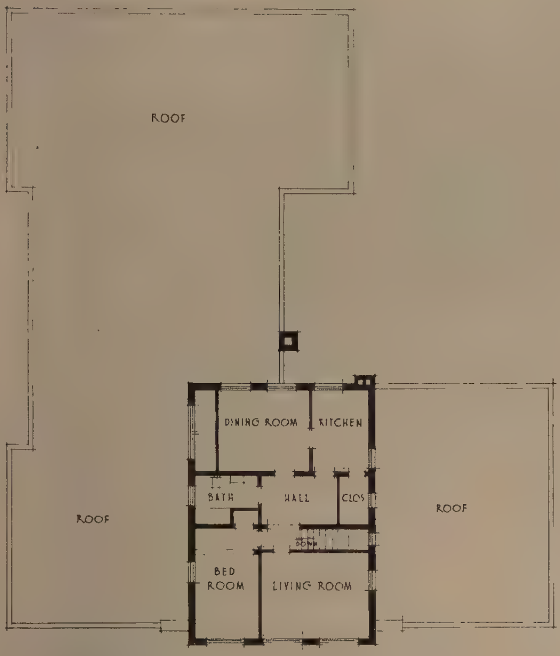
It is felt by the architects and the contractor that the use of plywood forms and proper care in planning construction joints contributed largely to the splendid surfaces that resulted. Construction joints were located at the win-

First architectural concrete jail in Virginia is this one at Lynchburg, a structure whose pleasant design belies its occupancy. Located in a residential area, it was designed by Hinnant and Smith, architects. John Miller was the contractor for this PWA project.

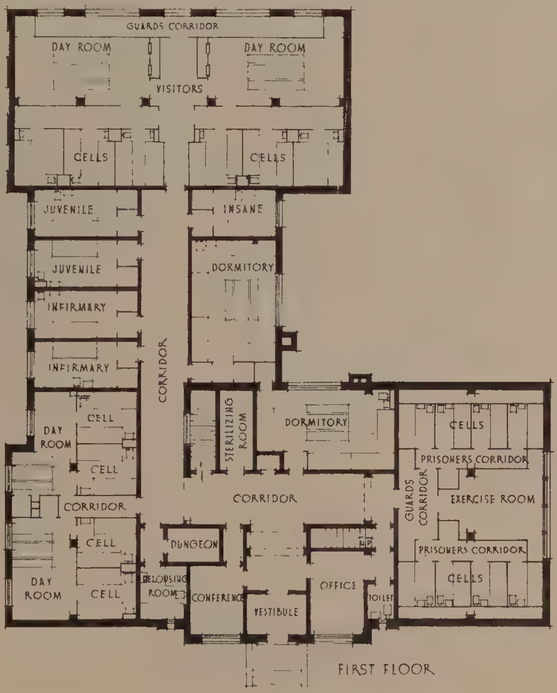




The odium of jail bars was avoided by use of special louvre windows which have the effect without the appearance of bars.



SECOND FLOOR

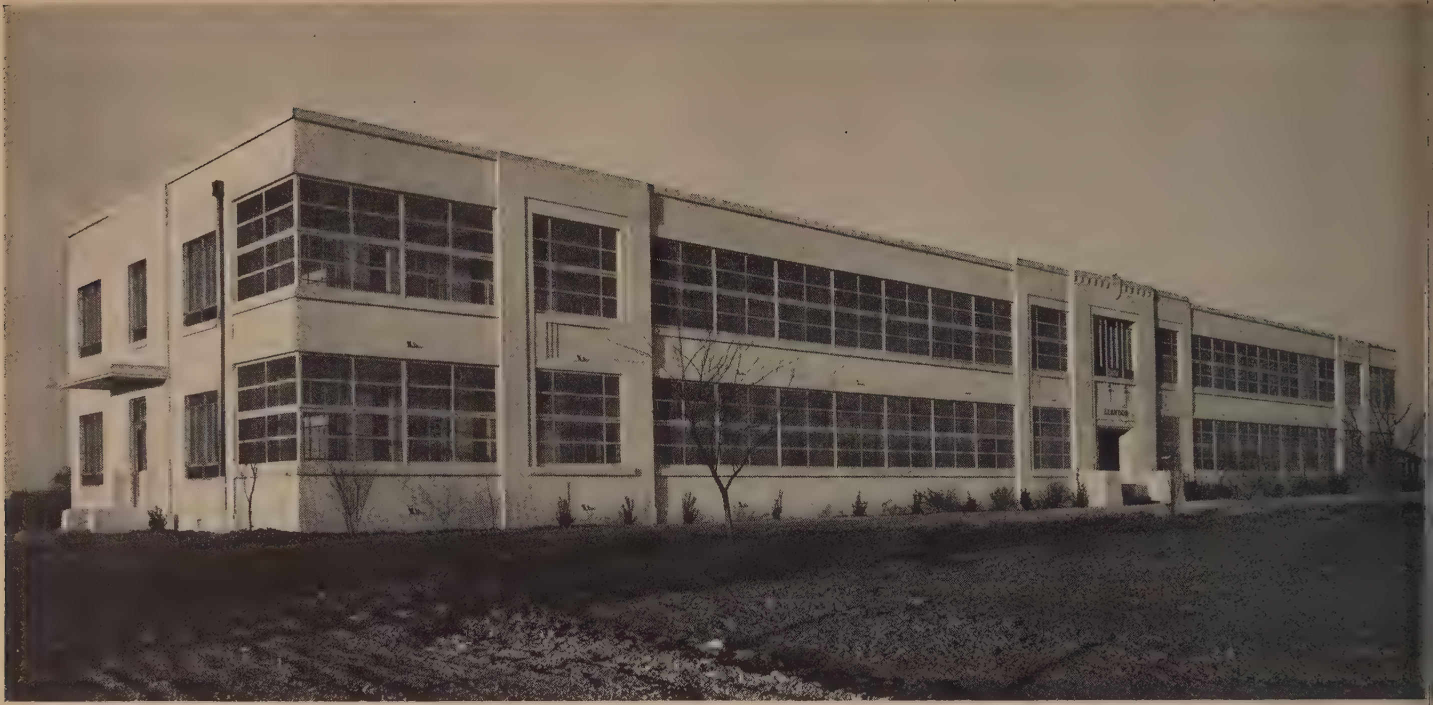


FIRST FLOOR

dow heads and bottom of floor slabs. Concrete was placed in lifts corresponding to these locations.

Steel detention sash was placed in the forms prior to placing concrete in the walls. Horizontal chases were left in the floors for attachment of cell work, and the cell work was set in place. After concreting was finished the cells were anchored to the chase by means of concrete curbs.

The completed building, since occupation in November, 1936, has been inspected and approved with most favorable comments by government, state and city officials.



Replacing a group of inadequate frame structures formerly used for care of tuberculosis patients is this new concrete sanatorium built for Fort Worth and Tarrant County, Texas. Smooth formed, with buff paint finish, it was designed by Preston M. Geren. Quisle and Andrews were the contractors.

Elmwood Sanatorium in Ft. Worth

By Preston M. Geren, Architect

CARE of tuberculosis patients has for some time been recognized as a public responsibility in the protection of community health. The burden of this care rests, in most states, on county and municipal authorities. In Tarrant County, Texas, which includes Ft. Worth, tuberculosis cases until recently had been treated in a group of small frame structures in a clean, open section of the country outside the city. The existing buildings offered inadequate space for hospitalization and efficient, centralized efforts to combat the disease were impossible. Operation costs were high in proportion to the facilities provided.

The old buildings, since the first of the year, have been replaced by Elmwood Sanatorium—a new, monolithic concrete structure designed in every detail to facilitate modern and efficient care for tuberculosis patients.

In design, the building is modern and functional. The need for large, unobstructed screened porches on the south elevation to provide the required sunlight and air treatment presented a problem which could not be treated honestly in a traditional manner. Without being unduly austere, therefore, the forms of the new building have been kept simple, with no attempt at dramatization. Architectural concrete provided the best medium in which the design could be executed, and it was proven by far the most economical form of construction.

The building, two stories in height, measures 200x78 ft. It provides approximately 21,000 sq. ft. of floor area and a volume of 275,000 cu. ft. Sixty-eight beds are provided for patients, 44 located in 8 wards, and 24 others in private rooms. The wards and rooms are arranged for segregation of men and women patients. The porches, separated from adjacent rooms by triple-hung windows, are cantilevered from the main structure. Beds can be rolled onto the porches directly from within the rooms and wards. By means of this arrangement, the central staff of doctors and nurses can maintain continuous observation throughout the building and can readily move patients in and out of the open air as treatment requires.

A large dining room for the use of ambulatory patients is located on the first floor. In addition, there are separate dining rooms for nurses and help. On the second floor there is a large recreation room, with a visitors' waiting room directly above the front entrance.

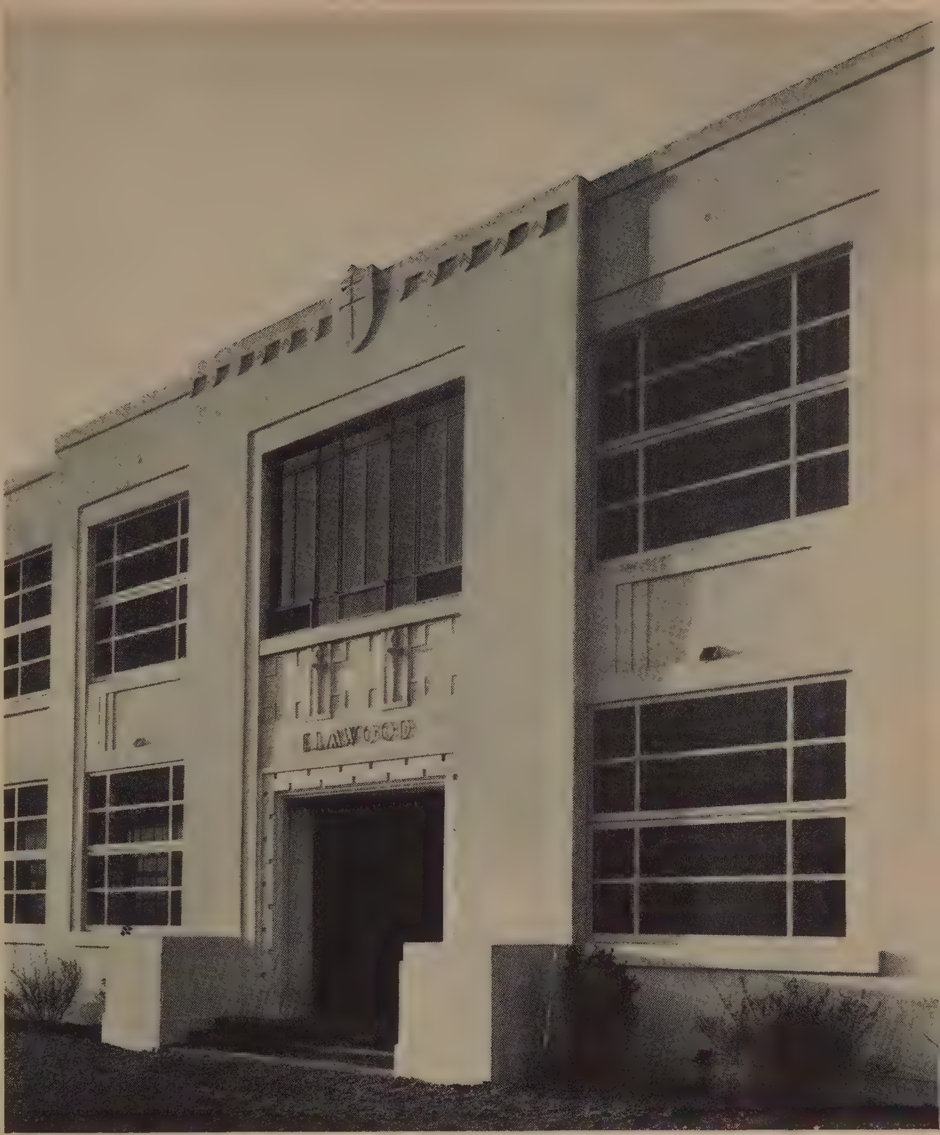
Spread footings were used for the foundations, with the first-floor slab partly suspended and partly on fill. The basement is small, providing only for heating plant and incinerator.

Forms for the outside face of all walls and piers were built of 1x6 dressed T-and-G boards set horizontally, with the exception of the central and two end motifs which were formed in Presdwood lined forms. All ornamental work on the front entrance including the band of shields at the coping, the beacons molded in the spandrel over the door and the trim around the entrance was formed with plaster waste molds. Ready-mixed concrete, used throughout the job, was conveyed from a central hopper to the forms in buggies. All concrete for the 8-in. exterior and porch walls, and for the piers, was placed with the aid of mechanical vibration, applied directly to the concrete at the point of placement. Where it was not possible to place concrete in a wall section in one continuous operation, an elephant trunk was used.

Forms were not stripped until 8 days after the concrete was placed, to prevent rapid drying. As a final finish the exterior surface of the walls was given two coats of buff-colored cement paint while the inside surface was plastered directly on the concrete without furring. All interior partitions were plastered.

Throughout the building the floors have a smooth, colored concrete finish. The concrete ceilings are left exposed and finished with white cement paint.

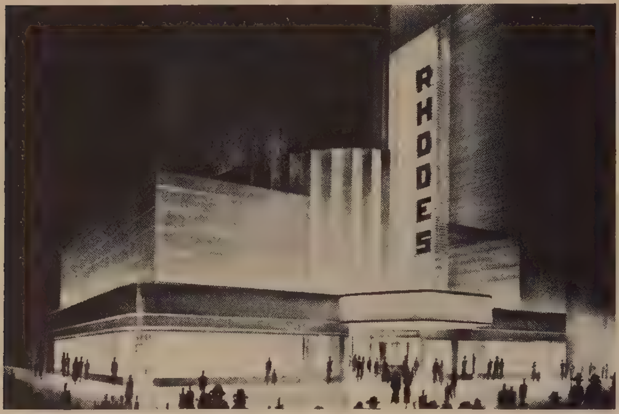
Elmwood Sanatorium was finished and ready for occupancy within 10 months after the work was started. Financed partially by the City of Ft. Worth and Tarrant County and in part by the Public Works Administration, total cost of the building without equipment was $101,733, or 37 cents per cu. ft. Quisle & Andrews of Ft. Worth were the contractors.

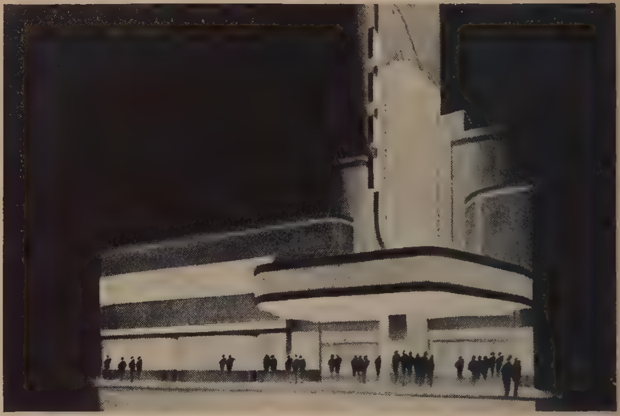


All detail about and over the entrance was formed in plaster waste molds. Vibration was used for forming walls and piers.

Plaster was applied to the interior walls without furring. The ceilings are exposed concrete; the floors have a linoleum top.

File 10-7-1 Being Letters, Notes and Advices About ARCHITECTURAL CONCRETE



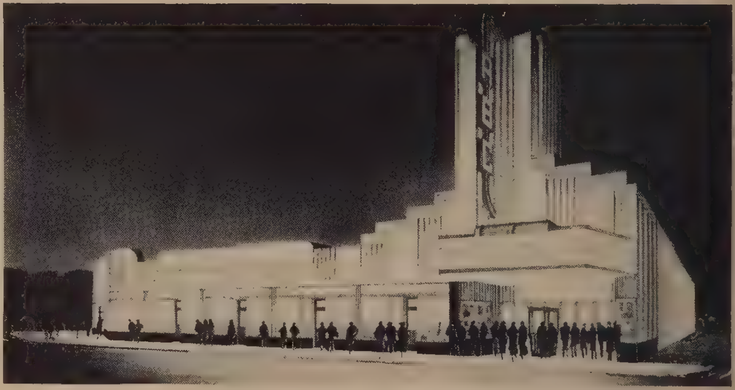


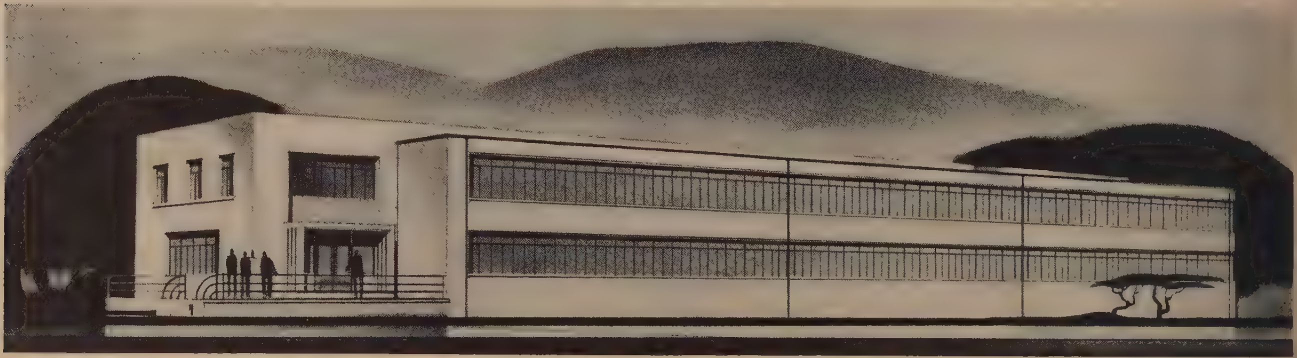
Now under construction in Chicago are three architectural concrete theaters designed by C. W. & Geo. L. Rapp, Inc.

Top left: *Warner Bros. Rhodes Theater, 79th Street and Rhodes Avenue, is being built by J. W. Snyder Co., general contractor.*

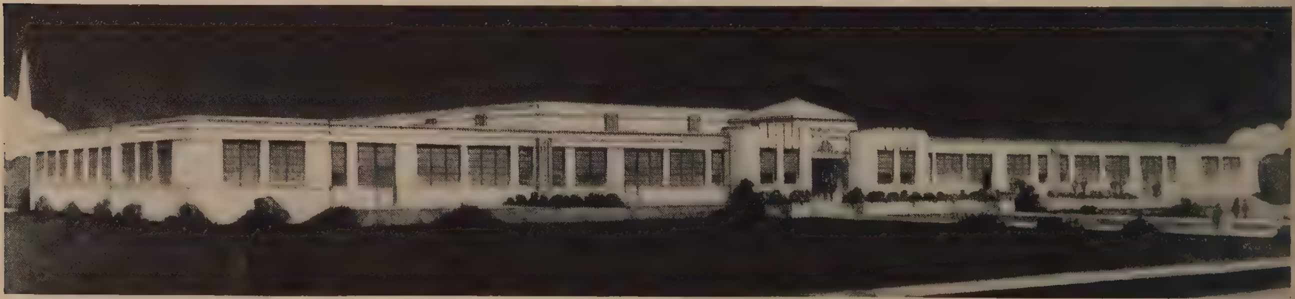
Top right: *Yet unnamed theater being erected for Sam C. Meyers at Devon & Maplewood by Avery Brundage Co., contractor.*

Right: *Theater at Belmont and Keating Avenues, built for lease to Balaban & Katz theater chain, by Paschen Bros., contractors.*

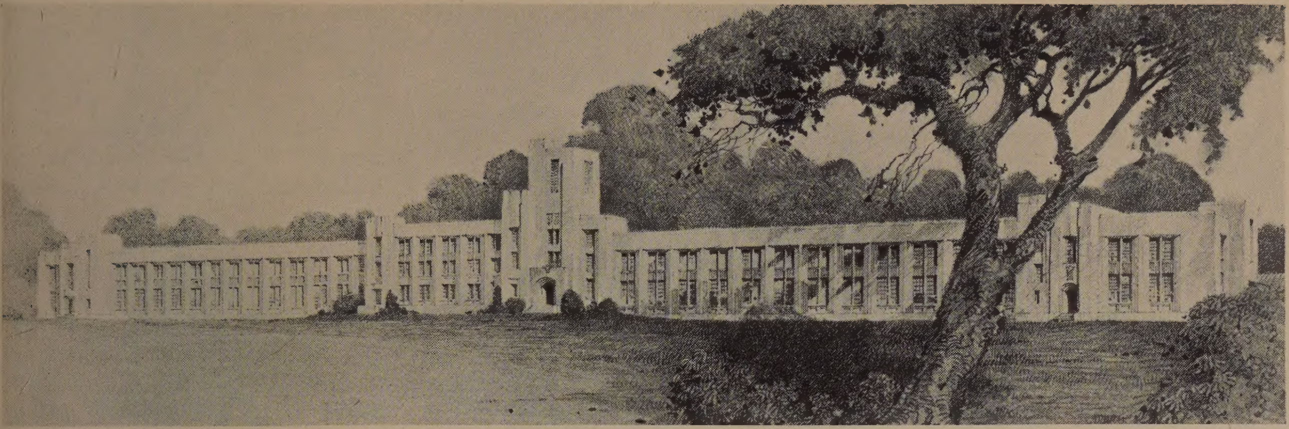




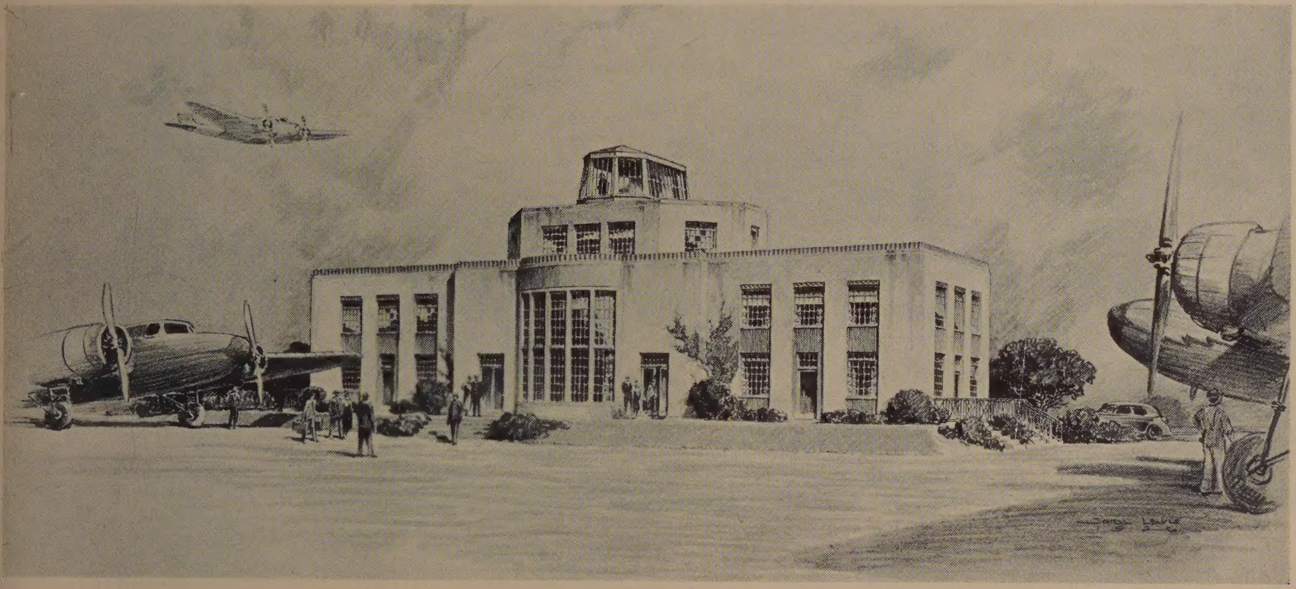
Architectural concrete dormitory for Kerrville State Sanatorium, Kerrville, Texas. C. H. Page, architect, of Austin. Hill & Combs, contractors, of San Antonio.



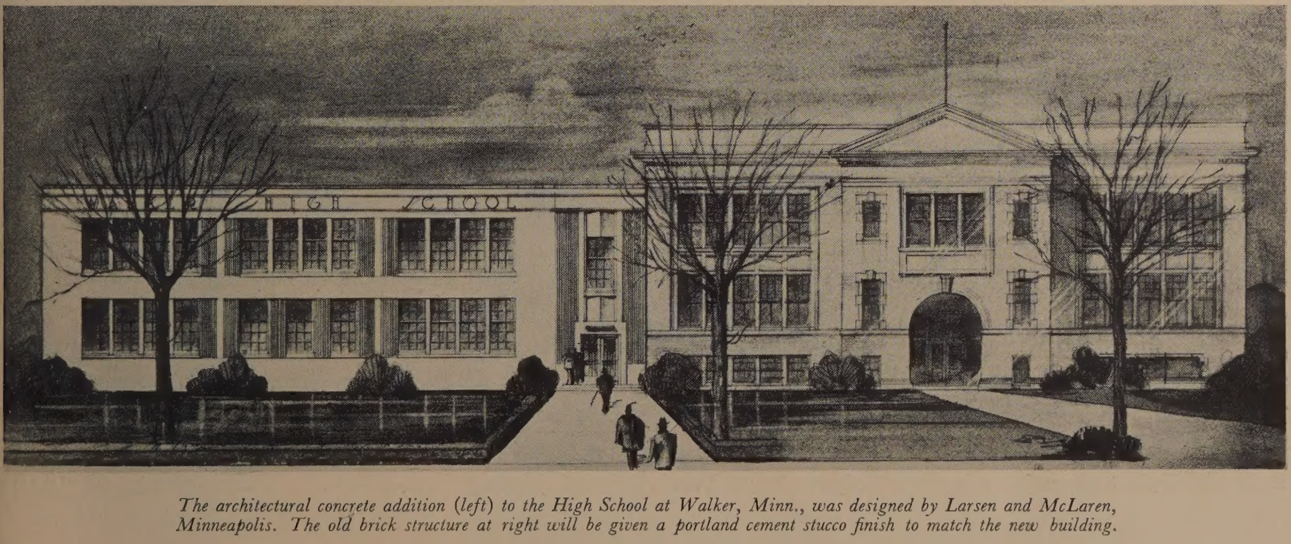
Project for one-story concrete elementary school at Robstown, Texas. Harmon & Company, of Corpus Christi, are the architects. Building now under construction.



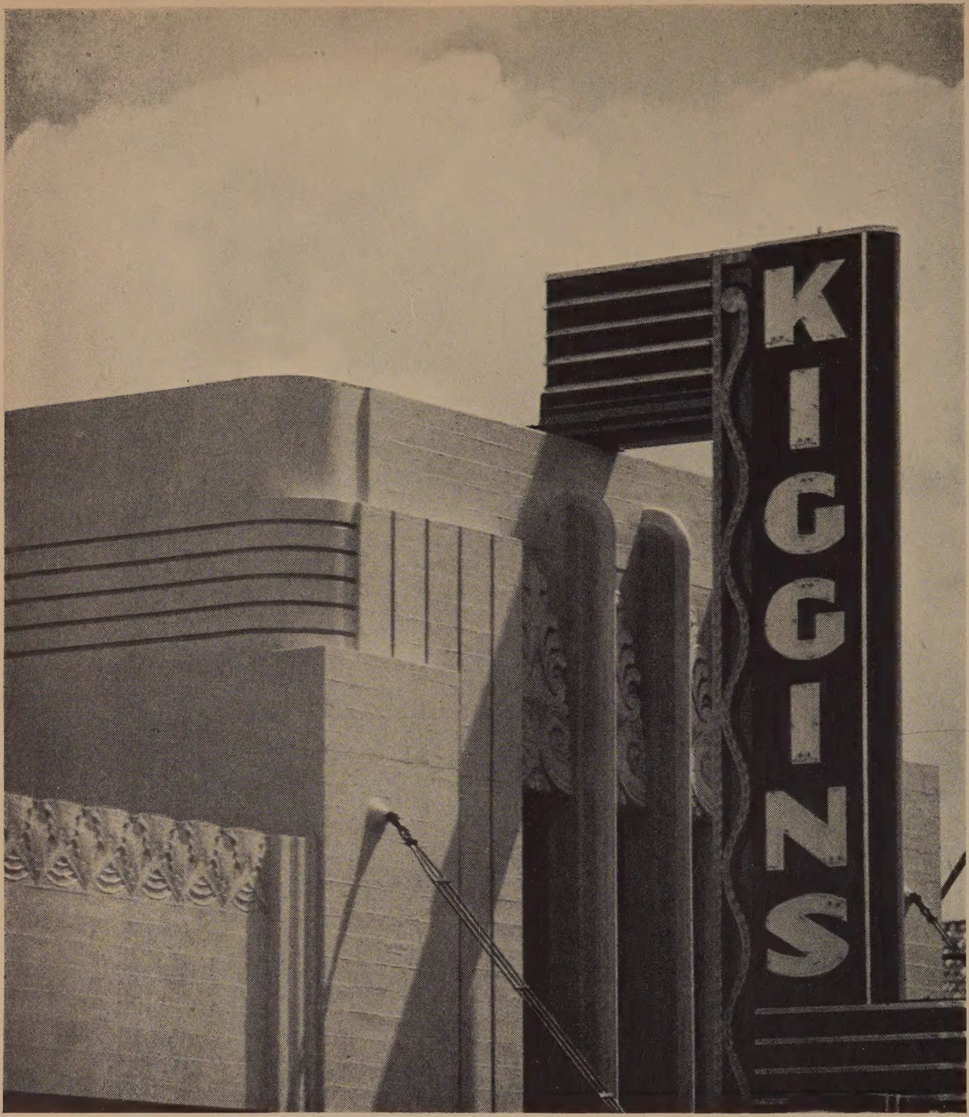
Now under construction at Carderock, Md., is this large architectural concrete Testing Basin for the Navy. It was designed by the Bureau of Yards and Docks



Designed for architectural concrete is the Administration Building of the Municipal Airport, now under construction at Memphis, Tenn. This modern structure was designed by Walk C. Jones and Walk C. Jones, Jr., Memphis architects.



The architectural concrete addition (left) to the High School at Walker, Minn., was designed by Larsen and McLaren, Minneapolis. The old brick structure at right will be given a portland cement stucco finish to match the new building.



Well-formed concrete surfaces characterize the sign tower of Kiggins Theater at Vancouver, Washington — an ultra-modern theater in a small town. The entire building block, containing four stores, was designed by D. W. Hilborn, architect and engineer, and built by Johnson Construction Co.

Modern Small City Theater

By D. W. Hilborn
Architect and Engineer

All buildings, whatever their character, present in planning the common problem of securing maximum returns from the effort and money to be invested in them. In the case of certain buildings of monumental character, this return may be largely one of beauty and fine appearance. In the majority of cases, however, it is the financial return from the buildings that constitutes the primary objective in their construction.

Yet the interesting part of the planning problem arises not in providing the indispensable minima of needs and requirements, but in determining what features and details a structure needs to make it a successful artistic project. It is in estimating the values and benefits derived from expenditures which might, for sheer utility, be foregone, in deciding how well one can afford to build, in selecting the most economical means of achieving desired effects, that the problem of planning finds its truest expression. This condition applies equally to the most pretentious and to the most modest work.

It is currently the practice in designing theater structures to include them in a building group with structures of other occupancy. Quite naturally the theater, being a vital factor in showmanship, should attract wide attention through beautiful or unusual design. It should not, however, so much overshadow the stores and shops which surround it that their effectiveness in inviting patronage is destroyed. The ideal in the design of a theater and shopping group such as the Kiggins Theater at Vancouver, Washington, is a building in which architectural integrity is maintained throughout the structure. The thoughtful planning of such a structure is reflected in higher returns to all the enterprises housed in it.

The Kiggins Theater group, which includes four small stores, covers a lot 101x106 ft., at Eleventh and Main

Streets, on the north bank of the Columbia River, facing Portland, Oregon, on the south bank. The site is an active corner on what is probably the most important street in the city. It naturally followed that the theater portion of the improvement should occupy an L-shaped space at the side and rear of the property, giving the stores the corner and most of the street frontage. This arrangement and division of space gave the stores the most desirable position so far as shopping is concerned, yet reserved for the theater an attractive approach from Main Street. This entranceway and the theater auditorium and stage are two stories in height, while the corner shops are but one story. Consequently, the theater dominates the group and suffers no loss in prominence by removal from the corner location. A large, brilliantly-lighted sign above the entrance marquee assures attention by night and day.

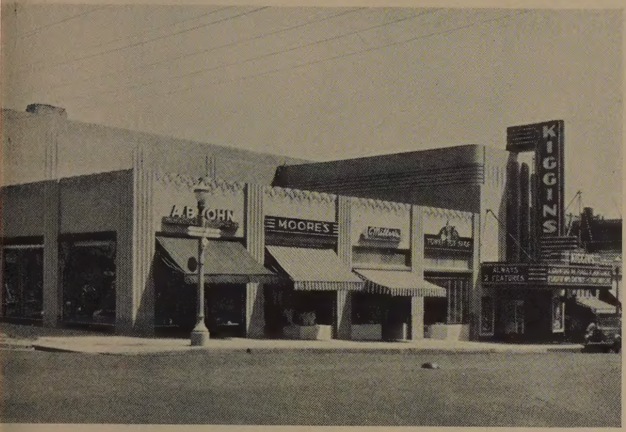
On the left of the entrance lobby curving stairs ascend to a large lounge which opens into a ladies' powder room and men's room on the second floor. On this level at the rear of the theater is a large projection room and service rooms. With the exception of this space, the entire theater is at ground level, permitting most economical construction. The stage is designed for cinema use only. It is shallow and raised a few feet above the well-pitched auditorium floor. There are comfortable, well-upholstered seats for 714 patrons.

Architectural concrete was used for the exterior of both the theater and stores, and for the interior of the theater auditorium. The exterior has a texture obtained by horizontal form-board marks, relieved by vertical fluting, horizontal reveals and modest use of offsets and pilasters. Decorative panels and courses were cast in plaster molds, modeled for the project by Victor Schneider of Portland, Ore. The exterior is finished in a warm buff cement paint.

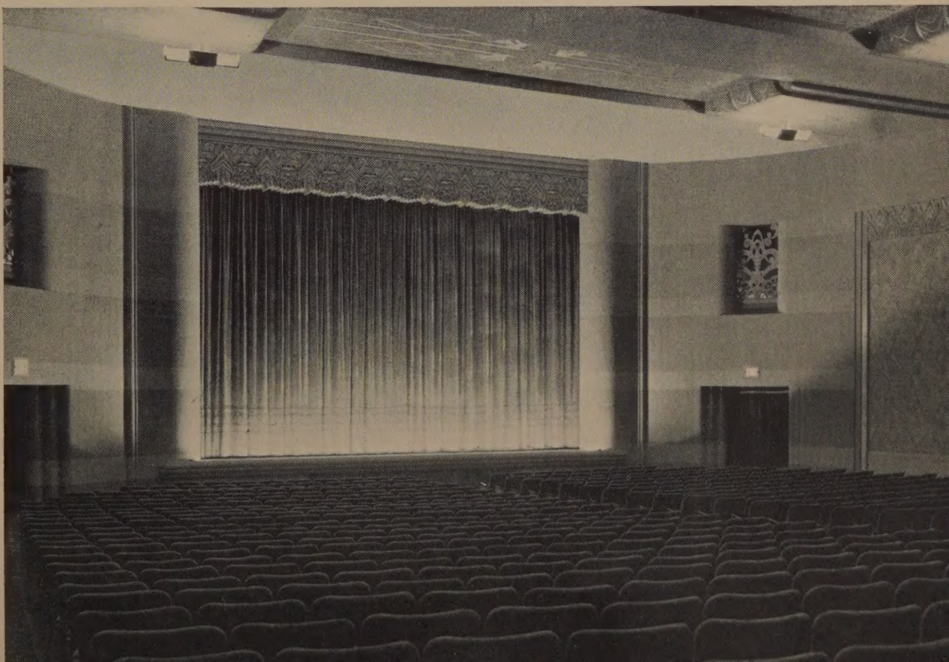
Concrete walls were used throughout the interior of the theater. Here the form marks run vertically with the walls painted in two soft harmonizing colors, in alternately wide and narrow bands. On each side wall are four large panels of acoustical plaster, finished with an interesting tapestry pattern. At the rear, the projection room is brought forward from the curved main wall.

The side walls curve smoothly into the proscenium, their junction being marked by a slight vertical offset. A particularly interesting effect was achieved in the proscenium girder where waste mold patterns used in sides and soffit suggest the gathered surfaces of heavy drapery. The rounded corners at the sides of the proscenium are plain, simple and columnar. A suspended ceiling is done in acoustical plaster. Simple in its treatment, the ceiling is relieved from severity by recessed panels and projections corresponding in position to the panels.

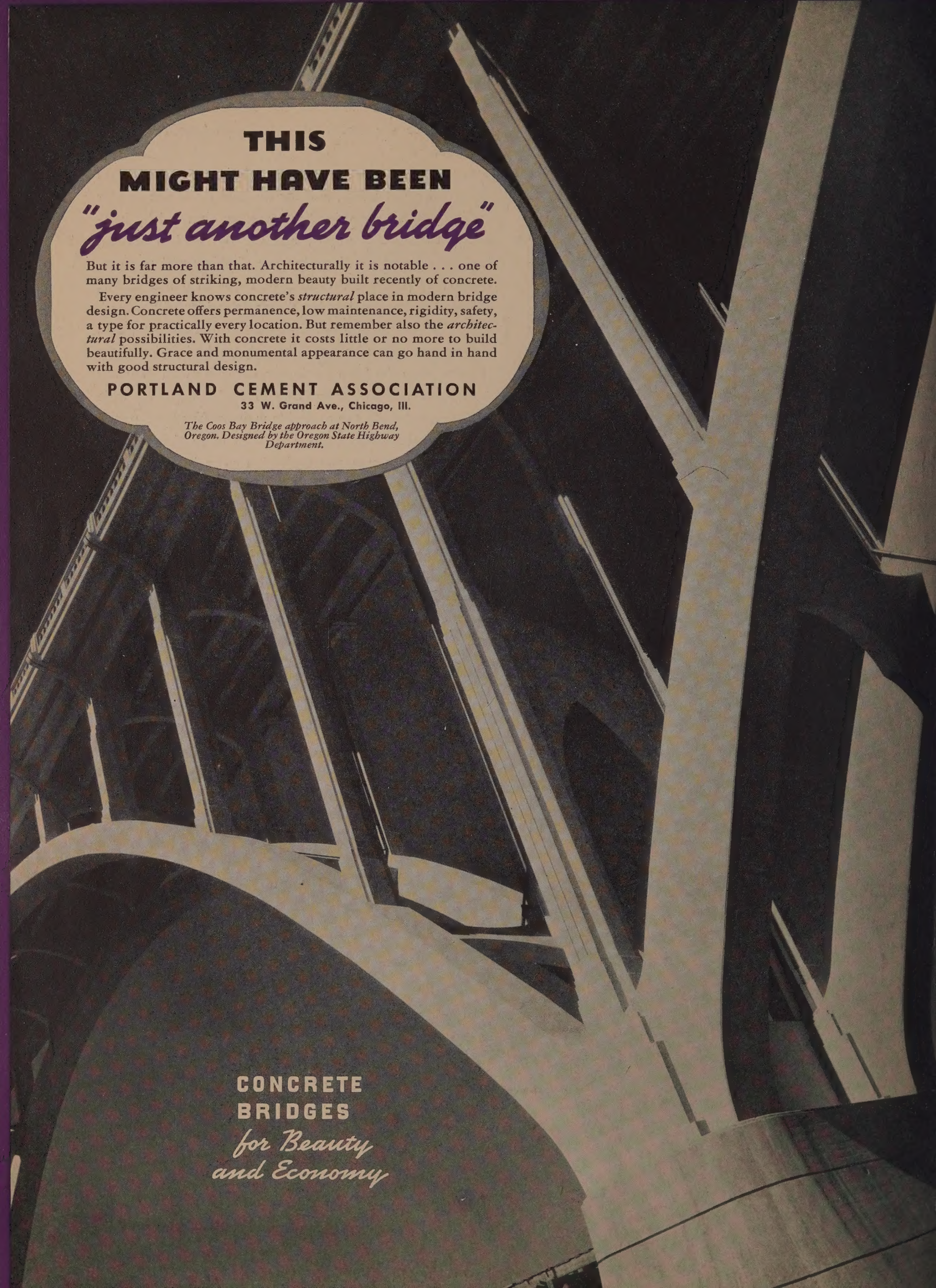
Completed several months ago by Johnson Construction Co., Vancouver, Wash., contractors, the theater and all the stores have been occupied and in service to the complete satisfaction of all concerned.



To provide maximum display space for the store rooms, the theater entrance was moved to the inside corner of the block where, due to its attractive handling, it suffers no loss in prominence.



The interior is simple, pleasant and dignified. The exposed concrete walls are decorated with plaster panels in tapestry patterns. The formed concrete proscenium has the appearance of a gathered curtain.



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The Coos Bay Bridge approach at North Bend, Oregon. Designed by the Oregon State Highway Department.